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TABLE OF THERMOMETRIC EQUIVALENTS.

To reduce Centigrade degrees to those of Fahrenheit : RULE.—Multiply by 9, divide by 5, and add 32.

To reduce Fahrenheit's degrees to those of the Centigrade scale : RULE.—Subtract 32, multiply by 5, and divide by 9.

Centigrade or Celsius.	Fahrenheit.	Centigrade or Celsius.	Fahrenheit.	Centigrade or Celsius.	Fahrenheit.	Centigrade or Celsius.	Fahrenheit.	Centigrade or Celsius.	Fahrenheit.	Centigrade or Celsius.	Fahrenheit.	Centigrade or Celsius.	Fahrenheit.
1410	2570	108	226.4	76	168.8	45.55	114	33.33	92	20	68	—10	14
1110	2030	107	224.6	75	167	45	113	33	91.4	19	66.2	—11	12.2
810	1490	106	222.8	74	165.2	44.44	112	32.77	91	18	64.4	—12	10.4
540	1004	105	221	73	163.4	44	111.2	32.50	90.5	17	62.6	—13	8.6
500	932	104	219.2	72	161.6	43.88	111	32.22	90	16.66	62	—14	6.8
400	752	103	217.4	71	159.8	43.33	110	32	89.6	16	60.8	—15	5
300	572	102	215.6	70	158	43	109.4	31.66	89	15.55	60	—16	3.2
260	500	101	213.8	69	156.2	42.77	109	31.11	88	15	59	—17	1.4
250	482	100	212	68	154.4	42.50	108.5	31	87.8	14	57.2	—17.77	0
240	464	99	210.2	67	152.6	42.22	108	30.55	87	13	55.4	—18	— 0.4
230	446	98	208.4	66	150.8	42	107.6	30	86	12	53.6	—19	— 2.2
220	428	97	206.6	65	149	41.66	107	29.44	85	11	51.8	—20	— 4
210	410	96	204.8	64	147.2	41.11	106	29	84.2	10	50	—21	— 5.8
200	392	95	203	63	145.4	41	105.8	28.88	84	9	48.2	—22	— 7.6
190	374	94	201.2	62	143.6	40.55	105	28.33	83	8	46.4	—23	— 9.4
185	365	93	199.4	61	141.8	40	104	28	82.4	7	44.6	—24	—11.2
180	356	93.33	200	60	140	39.46	103	27.77	82	6	42.8	—25	—13
175	347	92	197.6	59	138.2	39	102.2	27.50	81.5	5	41	—26	—14.8
170	338	91	195.8	58	136.4	38.88	102	27.22	81	4	39.2	—27	—16.6
165	329	90	194	57	134.6	38.33	101	27	80.6	3	37.4	—28	—18.4
160	320	89	192.2	56	132.8	38	100.4	26.66	80	2	35.6	—29	—20.2
155	311	88	190.4	55	131	37.77	100	26.11	79	1	33.8	—30	—22
150	302	87	188.6	54	129.2	37.50	99.5	26	78.8	0	32	—31	—23.8
148.88	300	86	186.8	53	127.4	37.22	99	25.55	78	—1	30.2	—32	—25.6
145	293	85	185	52	125.6	37	98.6	25	77	—2	28.4	—33	—27.4
140	284	84	183.2	51	123.8	36.66	98	24.44	76	—3	26.6	—34	—29.2
135	275	83	181.4	50	122	36.11	97	24	75.2	—4	24.8	—35	—31
130	266	82	179.6	49	120.2	36	96.8	23.88	75	—5	23	—36	—32.8
125	257	81	177.8	48	118.4	35.55	96	23.33	74	—6	21.2	—37	—34.6
120	248	80	176	47	116.6	35	95	23	73.4	—7	19.4	—38	—36.4
115	239	79	174.2	46.66	116	34.44	94	22	71.6	—8	17.6	—39	—38.2
110	230	78	172.4	46.11	115	34	93.2	21	69.8	—9	15.8	—40	—40
109	228.2	77	170.6	46	114.8	33.88	93						

TABLE OF ELEMENTARY SUBSTANCES.

U. S. P., 1880.

E ements.	Sym-bol.	Atomic Weight.	Equiva-lent.	Elements.	Sym-bol.	Atomic Weight.	Equiva-lent.
Aluminium.....	Al	27	13.5	Molybdenum ..	Mo	95.5	42.75
Antimony.....	Sb	120	120	Nickel.....	Ni	58	29
Arsenic.....	As	74.9	74.9	Niobium.....	Nb	94	94
Barium.....	Ba	136.8	68.4	Nitrogen [3].....	N	14	14
Beryllium (Glucinum).....	Be	9	9	Osmium.....	Os	198.5	99.25
Bismuth.....	Bi	210	210	Oxygen [4].....	O	16	8
Boron.....	B	11	11	Palladium.....	Pd	105.7	52.85
Bromine.....	Br	79.8	79.8	Phosphorus ...	P	31	31
Cadmium.....	Cd	111.8	55.9	Platinum	Pt	194.4	97.2
Caesium.....	Cs	132.6	132.6	Potassium	K	39	39
Calcium.....	Ca	40	20	Rhodium	Rh	104.1	52.05
Carbon [1].....	C	12	6	Rubidium.....	Rb	85.3	85.3
Cerium.....	Ce	141	70.5	Ruthenium....	Ru	104.2	52.1
Chlorine [2].....	Cl	35.4	35.4	Scandium.....	Sc	44	22
Chromium.....	Cr	52.4	26.2	Selenium	Se	78.8	39.4
Cobalt.....	Co	58.9	29.45	Silicon	Si	28	14
Copper.....	Cu	63.2	31.6	Silver	Ag	107.7	107.7
Didymium.....	Di	144.6	72.3	Sodium.....	Na	23	23
Erbium.....	E	165.9	82.95	Strontium.....	Sr	87.4	43.7
Fluorine.....	Fl	19	19	Sulphur [5].....	S	32	16
Gallium.....	G	68.8	34.4	Tantalum.....	Ta	182	182
Gold.....	Au	196.2	196.2	Tellurium.....	Te	128	64
Hydrogen.....	H	1	1	Thallium.....	Tl	203.7	203.7
Indium.....	In	113.4	56.7	Thorium.....	Th	233	116.5
Iodine.....	I	126.6	126.6	Tin.....	Sn	117.7	58.85
Iridium.....	Ir	192.7	96.35	Titanium.....	Ti	48	24
Iron.....	Fe	55.9	27.95	Tungsten.....	W	183.6	91.8
Lanthanum	La	138.5	138.5	Uranium.....	U	238.5	119.25
Lead.....	Pb	206.5	103.25	Vanadium.....	V	51.3	51.3
Lithium.....	Li	7	7	Ytterbium	Yb	172.7	172.7
Magnesium	Mg	24	12	Yttrium.....	Y	89.8	89.8
Manganese.....	Mn	54	27	Zinc.....	Zn	64.9	32.45
Mercury.....	Hg	199.7	99.85	Zirconium	Zr	90	45

[1] Carbon : 11.9736. [2] Chlorine : 35.370. [3] Nitrogen : 14.021.
[4] Oxygen : 15.9633. [5] Sulphur : 31.984.

A

COMPANION

TO THE

United States Pharmacopœia

BEING A

Commentary on the Latest Edition of the Pharmacopœia

AND CONTAINING THE

DESCRIPTIONS, PROPERTIES, USES, AND DOSES OF ALL OFFICIAL AND NUMEROUS UNOFFICIAL DRUGS AND PREPARATIONS IN CURRENT USE IN THE UNITED STATES, TOGETHER WITH PRACTICAL HINTS, WORKING FORMULAS, ETC.

DESIGNED AS

A READY REFERENCE BOOK FOR PHARMACISTS, PHYSICIANS, AND STUDENTS

With over 650 original Illustrations

BY

OSCAR OLDBERG, Pharm.D.

MEMBER OF THE COMMITTEE OF REVISION OF THE PHARMACOPŒIA OF THE UNITED STATES; PROFESSOR OF PHARMACY AND DIRECTOR OF THE PHARMACEUTICAL LABORATORIES OF THE ILLINOIS COLLEGE OF PHARMACY, CHICAGO

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SECOND REVISED EDITION

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PREFACE.

The Sixth Revision of the Pharmacopœia of the United States, to which this book is intended to be a companion, commentary, and supplement, differs essentially from its predecessors in many respects. It introduces decimal proportions in the determination of the strength of its preparations; it abolishes fluid measures and substitutes parts by weight in the formulæ for all liquid preparations, except the fluid extracts; it has greatly improved the descriptions and definitions of drugs and chemicals, and placed its standards of quality and purity far above those formerly official; it has materially improved upon most of the working formulæ, giving better processes for many of the chemical preparations, and more appropriate menstrua for most of the liquid galenical preparations; and it makes many real improvements in the direction of a correct and systematic nomenclature. The new Pharmacopœia has its defects; but it is none the less a great step forward.

In accounting for the appearance of the Companion to the United States Pharmacopœia, it is necessary to state that we believe that some of the features of the new Pharmacopœia will temporarily demand much labor on the part of a great majority of the pharmacists who use it, and that one of the objects of the Companion is to lighten this labor, if not to obviate it. The new methods are so unlike those with which the professions are familiar, and are so out of harmony with the prevailing manner of prescribing and administering liquid medicines, that although the changes in the strength of the pharmacopœial preparations are few and generally unimportant, the old and the new cannot be readily compared, and this in itself is a

material disadvantage. We refer the reader to the article "parts by weight" under the title WEIGHTS AND MEASURES in the latter part of this book.

The Companion is also designed as a ready reference book and working manual. In its preparation we have endeavored to give due regard to the actual conditions and requirements of the trade and of the professions concerned, and to give only such information as physicians and pharmacists have constant use for in their daily business. Hence botanical descriptions of mother plants, the physiological actions of medicines, and much other information not daily referred to, are omitted, and the practical facts and suggestions given are thus found at a glance. Works of a more encyclopædic character cannot be as suitable for ready reference.

The Pharmacopœia treats of but a limited number of the drugs and preparations in current use, and omits many which are used quite extensively. The Companion supplements the Pharmacopœia in treating of the official drugs and preparations, and translates the "parts by weight" of its working formulæ into definite quantities by weight and measure. It does not repeat descriptions, tests, etc., given in the Pharmacopœia. It is, in fact, as its title implies, a companion to the Pharmacopœia, and not a substitute for it.

The Companion treats of all drugs and preparations used to any considerable extent in the current practice of medicine, without reference to their real or supposed virtues or want of virtues.

The illustrations are nearly all from original drawings by Professor Otto A. Wall. Most of these drawings are from actual specimens of the respective objects; a few are from Berg and Schmidt, and other sources. Our thanks are tendered to Messrs. Lehn & Fink, W. H. Schieffelin & Co., and McKesson & Robbins, of New York; B. O. & G. C. Wilson, of Boston; Thomsen & Muth, of Baltimore, and Wallace Bros. & Stephenson, of Statesville, N. C., for specimens generously sent us.

The arrangement of the titles in the Companion is, in the opinion of the authors, preferable to any other in practical utility. All the

principal drugs and chemicals are arranged in alphabetical order, and all the preparations of each drug or chemical are put alphabetically under it. This enables the reader to compare most readily all the various forms in which each medicine is used.

In regard to the nomenclature used in the Companion, it is proper to say that it is the one best adapted to the above-described arrangement of the titles. In our opinion the pharmacopœial nomenclature ought to be in accordance with the same general plan, because it combines systematic classification with alphabetical order. It should be remembered that a pharmaceutical nomenclature made up of words from the Latin is, after all, not Latin, but simply technical terminology, and should be made to serve its purposes as perfectly as possible without regard to any nice requirements of the Latin language. Thus we would even prefer that the titles of Latin origin chosen to make up the pharmacopœial nomenclature be, in fact, treated as indeclinable words, thus abolishing the genitive, as illustrated in the Unofficial Pharmacopœia by one of the authors of the Companion.

Formulæ are contained in the Companion for perhaps nearly all the tinctures, extracts, fluid extracts, syrups, the principal elixirs, and other pharmaceutical preparations used.

The differences in strength and other differences, where any exist, between preparations of the old and the corresponding preparations of the new Pharmacopœia, are plainly stated.

The weights and measures used in the working formulæ, as given in the Companion, are both metric, and avoirdupois weight, and metric as well as United States (or "wine") measure, side by side.

The Companion gives concisely the medicinal properties and uses of all the medicines of which it treats, and states the dose after each article. Care has been taken to give the correct doses in the simplest terms, rather than to give the exact equivalents according to the two systems, which would involve odd fractions. It also contains needful practical information relative to the preparation and use of hypodermic and other injections, as well as inhalations, baths, and

other forms of medication not usually referred to in books of similar description.

A chapter giving practical suggestions as to the use of the microscope in pharmacognosy is added, in view of the great importance of the subject and the want of any handbook specially adapted to this study. For similar reasons the authors have also included a brief account of the microscopic structure of plants. Both of these chapters are the work of Professor Otto A. Wall.

A general reference to the proximate principles of plants and drugs will be found under the title EXTRACTA FLUIDA. Chapters on the modes of administration of medicines, and on prescription writing, are also added, in the hope that they may prove useful.

The tables of equivalents of weights and measures, thermometric degrees, etc., are comprehensive. The relation of weight to volume and *vice versa* is generally given wherever requisite. Tables of extensive practical applicability are placed on the insides of the covers and on the opposite pages of the fly-leaves, where they can be found without delay.

That the pharmaceutical and chemical portions of the Companion are largely the work of Professor Oscar Oldberg, and the therapeutical portions the work of Professor Otto A. Wall, will be understood.

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A COMPANION

TO THE

UNITED STATES PHARMACOPŒIA.

Absinthium; U. S.

ABSINTHIUM.

Absinthii Summitates — *Wermuth*, G.; *Absinthe commune, Grande absinthe, Armoise amère*, F.; *Ajenjo*, Sp.; *Malört*, Sw.; *Wormwood.*

Origin.—*Artemisia Absinthium*, Linné (Compositæ).

Habitat.—Northern hemisphere; cultivated.

Parts used.—The leaves and flowering tops.

Description.—See the Pharmacopœia, page 1. A good drug, is free from coarse stems, consists chiefly of leaves and flowers, and has a characteristic, strong, aromatic odor. Wild wormwood, which is better than the cultivated, is more hairy.

Constituents.—The aroma is due to a *volatile oil*, of which it contains from one-half to one and one-half per cent. The bitterness belongs to a peculiar substance called *absinthin*, which is freely soluble in alcohol and slightly so in hot water. The bitter taste of the *absinthin* is known to be imparted to the milk, urine, and even flesh of animals feeding upon wormwood.

Medicinal Properties.—Wormwood is a powerful aromatic bitter tonic, useful in atonic and flatulent dyspepsia and impaired digestion due to general debility of the intestinal tract. In over-doses it is said to produce disturbance of the cerebral functions, and even convulsions.

It is one of the ingredients of "absinthe," an intoxicating "liqueur" or bitters used in France and elsewhere, an abusive use of which leads to serious mental and physical derangement; but these results can be only partly ascribed to the wormwood, as the alcohol and other ingredients tend to produce the same effects.

ABSINTHII EXTRACTUM.

EXTRACT OF ABSINTHIUM.—EXTRACT OF WORMWOOD.

Evaporate the fluid extract to the pilular consistence, and then add five per cent. glycerin.

Brownish green. Yield about twenty-five per cent. Used chiefly as an adjuvant in pills.

Dose.—0.30 to 0.65 gram (five to ten grains).

ABSINTHII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ABSINTHIUM.—FLUID EXTRACT OF WORMWOOD.

To make five hundred cubic centimeters (or its equivalent, 17 fluidounces).

Use five hundred grams (or its equivalent, $17\frac{2}{3}$ avoirdupois ounces) of the drug in No. 30 powder.

As a *menstruum*, use diluted alcohol. Moisten the drug with two hundred and fifty grams (about 9 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours; then percolate. Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Very dark greenish brown.

Dose.—0.5 to 2.5 cubic centimeters (8 to 40 minims).

ABSINTHII INFUSUM.

INFUSION OF ABSINTHIUM.—INFUSION OF WORMWOOD.

Take thirty grams (1 ounce) wormwood to make three hundred cubic centimeters (10 fluidounces) of colature.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms). The fluid extract is preferable.

ABSINTHII TINCTURA.

TINCTURE OF ABSINTHIUM.—TINCTURE OF WORMWOOD.

From sixty grams (2 ounces) coarsely powdered wormwood make three hundred cubic centimeters (10 fluidounces) of tincture by percolation with diluted alcohol.

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

Absinthii Oleum.

OIL OF ABSINTHIUM.—ABSINTHII ÆTHEROLEUM; VOLATILE OIL OF ABSINTHIUM.—OIL OF WORMWOOD.

This is the dark-green volatile oil from wormwood. It possesses, in a high degree, the powerful aromatic odor of the drug. Adulterations and substitutions of various kinds are not uncommon.

It is a powerful vascular and nervous stimulant, increasing the peristaltic motion of the intestines. It has, therefore, been used to promote the expulsion of intestinal worms. In large doses the oil is narcotic, causing pain in the epigastrium, nausea, vomiting, headache, vertigo, and delirium.

Dose.—From one to three drops.

Salts of Wormwood is occasionally called for even to this day. Originally this was simply the potash washed out of the ash of wormwood. Now it is customary to dispense pearl-ash under that name, and sometimes a little oil of wormwood is added. The real salts of wormwood, which now no longer exists, never contained any oil of wormwood.

Abstracta.

ABSTRACTS.

This class of preparations is new. Abstracts are powdered saccharated extracts, of a definite strength, representing uniformly twice their weight of the crude drug. They are dry powders, containing the ex-

tracted soluble constituents of the crude drugs, diluted with powdered milk-sugar in such proportions that each pound of abstract represents two pounds of the drug from which it was made. An abstract is, in other words, twice the strength of the fluid extract of the same drug.

The advantages of these preparations are : The dose is comparatively small, and its relation to the dose of the drug or of the fluid extract easily remembered. In the preparation of an abstract it is easier to avoid an injurious exposure to heat, even on a small scale, than in the preparation of powdered extracts. The trituration which constitutes the last step in the process of making an abstract, should be so thorough as to reduce the preparation to the finest state of division practicable. Being a dry powder, an abstract is most conveniently weighed out and divided without waste.

Preparation.—As seen in the text of the Pharmacopœia, the drug, in powder of requisite fineness, is first exhausted by percolation with the proper menstruum ; the fluid extract thus obtained is mixed with one-fourth its weight of powdered milk-sugar, and the mixture dried in a moderately warm place (not over 50° C., equal to 122° F.), after which an additional quantity of powdered milk-sugar is added, so that the whole finished product shall weigh one-half as much as the crude drug operated upon, and the trituration to fine powder finishes the process.

It is obvious that abstracts can be made only of drugs yielding less than fifty per cent. of dry solid extract, and that it would be useless to make such preparations of drugs, the doses of which are comparatively large, as large quantities of dry powders cannot be conveniently taken.

The official abstracts in the new Pharmacopœia are eleven in number, viz. : aconite root, belladonna root, conium fruit, digitalis, hyoscyamus leaves, ignatia, jalap, nux vomica, podophyllum, senega, and valerian. Abstracts of senega and valerian are necessarily inferior to the extracts, as the constituents are largely destroyed or dissipated in drying them. The abstracts of belladonna, conium, digitalis, hyoscyamus, and Indian cannabis, are very liable to cake together.

All abstracts must be put up in small, dry bottles, which are to be tightly corked and put in a dry, cool place. An abstract which was originally well made, but which has caked from warmth or moisture, or both, can usually be readily reduced to powder again with the pestle.

Dose.—The dose of any abstract is one-half the weight of the dose of the fluid extract of the same drug.

Acacia; U. S.

ACACIA.

Acaciæ Gummi; Gummi Arabicum—Arabisches Gummi, G.; *Gomme Arabique*, F.; *Goma Arábiga*, Sp.; *Arabiskt Gummi*, Sw.—*Gum Arabic.*

Origin.—*Acacia Verek*, Guillemin et Perrottet, and other species of Acacia (Leguminosæ).

Habitat.—Africa.

Part used.—The dry gummy exudation.

Description.—See the Pharmacopœia, page 8. Select No. 1 gum arabic—the kind pharmacists use for medicinal purposes—is the grade described in the Pharmacopœia. It must be free from impurities or discolored pieces; has but a faint, peculiar, not the least sourish odor; is completely soluble in an equal weight of water, forming mucilage.

Varieties and Grades.—The best acacia comes from *Kordofan.* "*Senaar gum*" is also of fine quality.

Some varieties of gum arabic, although of handsome appearance, do not dissolve completely in water, having probably been dried too far or exposed to a too high temperature in drying, whereby the arabic acid is altered (see mucilage).

Senegal gum is more clear or transparent than *Kordofan gum*, having but few fissures; the tears are also larger in this variety of acacia; but it is always more or less colored (yellowish or reddish), and its taste is not as pure.

Mezquite gum is also discolored, and a mucilage made from it does not give a precipitate with subacetate of lead, ferric chloride, or borax. The different grades of gum arabic in the market are designated by numbers, No. 1 being the best tears selected from the whole lot. The next best selection becomes No. 2, and so on, until about five selections have been made. The remainder, consisting of more or less colored pieces and all the impurities, receives the designation "sorts." The term "sorts," however, sometimes means the unsorted gum arabic containing all the grades, or consists of all except the first and second grades. Jobbers sometimes distinguish between "strong" and "weak" gums, these designations having reference partly to the relative quantity of moisture contained in the drug, the "strong gums" being the drier; and partly to the degree of solubility, the weaker gums being those which swell in water but do not completely dissolve.

Original Packages.—Picked gum arabic is sold in cases of two

hundred and fifty to three hundred and fifty pounds; "sorts" in bales of three hundred to four hundred and fifty pounds. First select gum arabic ("Turkey") is quoted at three times the price of sorts.

Forms.—*Gum arabic in tears* has been already described above.

Granulated gum arabic is of necessity always made from the very best quality of the gum, as any lower grade would be readily recognized by its appearance. It should have a perfectly pure white color, and be free from fine powder. Should also be dry and have no odor, except the faint one properly belonging to prime gum arabic. Granulated gum arabic dissolves in water more readily than the powdered.

Powdered gum arabic should be perfectly white, dry, mobile, and fine.

Constituents.—Pure gum arabic consists almost entirely of gummate of calcium. The amount of moisture averages about seventeen per cent.

Tests.—As gum arabic dissolves entirely in cold water any portion remaining undissolved is an impurity or adulteration. The faintest sourish odor being developed when a handful of the drug is blown upon with a pure moist breath is an indication of poor quality.

Powdered gum arabic is sometimes adulterated with starch or flour. This may be detected by dissolving the sample in *cold* water, in which the starch will not dissolve. If the acacia is pure a very nearly clear solution will be obtained, with scarcely any undissolved sediment.

Preservation.—Acacia must be kept in a dry place. Powdered acacia, especially, must be well protected from moisture to prevent it from caking and from becoming mouldy or sourish.

Medicinal Uses.—Gum arabic is a valuable demulcent. It can be given *ad libitum*. In the form of mucilage it is used in inflammations of the stomach or intestines, dysentery, typhoid fever, etc. It is often prescribed in the "summer complaint" of children, and then somewhat diluted; in cases of this kind, where an astringent and stimulant is indicated, the domestic wine known as "Virginia Seedling" is a favorite remedy in combination with mucilage among Western physicians.

To allay cough resulting from irritation in the pharynx or about the epiglottis, or in any cases of pharyngitis or laryngitis, gum arabic may be dissolved slowly in the mouth or used in the form of lozenges.

Pharmaceutical Uses.—It is used as an excipient in pills and lozenges, mixtures, etc., and for disguising the taste of some acrid remedies. Tincture of cantharides, chloroform, ammonium carbonate, etc., are less apt to irritate when given with mucilage of acacia. In mixtures in which insoluble powders are dispensed, the addition of gum arabic

prevents the powder from precipitating too rapidly, as in *mistura cretæ composita.*

The use of acacia in forming pill masses is not always attended with the best results, as the mass is liable to dry too hard. As a coating for pills it is, however, very good, especially when combined with gelatine.

The use of acacia for preparing emulsions, for which purpose no other agent will answer as well, will be discussed under the title Emulsions, on page 422.

ACACIÆ MUCILAGO; U. S.

MUCILAGE OF ACACIA.

Preparation.—Put one hundred and seventy grams (6 avoirdupois ounces) of acacia in pieces into a bottle capable of holding from four hundred and fifty to five hundred cubic centimeters (from 15 to 17 fluidounces); pour upon it about two hundred and fifty cubic centimeters (or about half a pint) of cold water, shake it up a second or two, and after the acacia has settled somewhat pour away the water, the object of this washing being simply the removal of dust. Now add to the acacia three hundred and thirty cubic centimeters (11 fluidounces) of tepid distilled water, cork tightly, shake together, and then lay the bottle down on its side. Turn it over occasionally so that the cake of acacia may be at the top. The solution formed will settle to the bottom, leaving the acacia always in contact with a fresh supply of solvent, thus materially hastening the process. When the acacia is all dissolved strain the mucilage.

The Pharmacopœia does not prescribe the use of distilled water, but the preparation is less liable to ferment if the organic ferments contained in ordinary water be avoided. The use of tolu water (see page 997) is also a decided improvement, not only because it will preserve the mucilage from decomposition, but because, in addition, it makes the preparation very agreeable. To pick out the finest and clearest tears of acacia for making mucilage will add no little to its quality, and the result will justify the trifling additional trouble.

The use of boiling water will not hasten the solution of the gum. It makes the product thicker and very difficult to strain, probably because a portion of the arabic acid is changed to metarabic acid, which simply swells but does not dissolve in the water.

Specific Gravity and Strength.—The official mucilage of acacia has a specific gravity of 1.13 to 1.14—that is, one hundred cubic centimeters of it will weigh one hundred and thirteen to one hundred and fourteen grams, and ninety-six fluidounces weigh one hundred and thirteen to one hundred and fourteen avoirdupois ounces. To make one

hundred cubic centimeters of mucilage requires 38.6 grams of acacia, and to make ninety-six fluidounces would take thirty-eight ounces and two hundred and sixty grains of it. Thus 38.6 grams of acacia, when dissolved in water, will add twenty-five cubic centimeters to the volume of the liquid, and thirty-eight and one-half avoirdupois ounces of acacia dissolved in water occupies the space of twenty-four fluidounces.

Opaque.—Mucilage of acacia is not perfectly colorless and clear, but at best slightly opalescent.

Preservation.—It keeps best when put into small bottles (holding about one hundred and eighty cubic centimeters, or six fluidounces), which must be quite filled, tightly corked, and put in a cool place.

Uses.—Mucilage is much used to emulsify fixed oils, etc. To triturate the oil with powdered gum arabic and afterward with the water is a far better process. However, thirty grams (1 ounce) mucilage will be required for sixty grams (2 ounces) fixed oil, and the same quantity for twenty grams ($\frac{2}{3}$ ounce) of copaiba. Its emulsifying properties are greatly impaired and finally destroyed by fermentation. Mucilage which has begun to ferment is wholly unfit for any use.

ACACIÆ SYRUPUS; U. S.

SYRUP OF ACACIA.

Prepared by simply mixing one hundred grams (3 ounces 230 grains) mucilage of acacia and four hundred grams (14 ounces 48 grains) simple syrup.

Practically the same result will be obtained by mixing one hundred cubic centimeters ($3\frac{3}{8}$ fluidounces) mucilage of acacia and three hundred and fifty cubic centimeters ($11\frac{3}{4}$ fluidounces) simple syrup.

As this preparation does not keep sweet but a very short time, the Pharmacopœia prescribes that it be made fresh whenever wanted for use.

It is almost as colorless and clear as pure water.

Aceta.

VINEGARS.

Essige, G.; *Vinaigres*, F.; *Vinagre*, Sp.; *Ättikor*, Sw.

Several of the active principles of drugs, among which are certain alkaloids, volatile oils, resins, and acrid principles, may be dissolved out by the use of diluted acetic acid or vinegar. Other solvents are, how-

ever, so much better in most cases that the number of official vinegars is now quite limited, there being only four in our present Pharmacopœia, viz., those of lobelia, opium, sanguinaria, and squill, each of which represents one-tenth the strength of the drug, being prepared from one part of the drug to ten parts of the menstruum.

The medicated vinegars do not keep very well, and are, on the whole, unsatisfactory and disagreeable preparations. They are therefore rarely used, with the exception of the vinegar of squill, which is used only as a constituent of the syrup of squill.

Acetum.

VINEGAR.

Acetum Commune; Acetum Vini—Essig, G.; *Vinaigre*, F.; *Vinagre*, Sp.; *Ättika*, Sw.

A liquid containing from four to five per cent. of anhydrous acetic acid ($C_4H_6O_3$), or five to six per cent. absolute acetic acid ($HC_2H_3O_2$), obtained by fermentation from cheaper grades of wine, or from grape-juice, cider, weak spirit, malt, or unmalted grain.

The best vinegar is that made from pure white wine ("white wine vinegar"). Cider vinegar is also of good quality when properly made.

Good vinegar has an agreeable acid taste and odor, free from all acrid and empyreumatic matters, which, when present, impart to vinegar a disagreeable, smokish odor and taste.

Tests.—The presence of metallic impurities, such as lead, copper, tin, iron, or calcium, are detected by the tests given for acetic acid by the Pharmacopœia. When supersaturated with an alkali or alkaline salt it should not develop a smoky odor or taste. Sulphuric acid is detected by the precipitate it forms upon the addition of solution of barium chloride. Sharp acrid substances, such as pepper, mustard, etc., if present, are recognized by the odor and taste upon neutralizing the vinegar with magnesium carbonate.

Pharmaceutical and Household Uses.—Pure diluted acetic acid is now substituted in the Pharmacopœia for the vinegar formerly official. Unless the acid be perfectly pure, however, good vinegar is preferable. But common vinegar is itself frequently made by diluting impure acetic acid (contaminated with empyreumatic products); such vinegar is extremely offensive, and unfit for either pharmacal or table uses.

Medicinal Uses.—Vinegar is a household remedy that is often employed both internally and externally. It assuages thirst when taken

internally, and for this purpose may be given in water with sugar to suit the taste. In febrile conditions it produces a cooling effect.

It may also be employed externally in the form of a lotion, one part to four or five parts of water, to be sponged over the surface of the body, and not merely over the forehead and hands, as is often done. Sponging a large part of the surface of the body abstracts much heat by the evaporation of the liquid, and thus reduces the temperature, the vinegar adding markedly to the sense of refreshing relief.

For reasons of convenience this sponging is often preferred to the wet pack or bath, either of which acts more powerfully and promptly, and one of these methods of reducing temperature is therefore to be preferred in dangerous exacerbations of the febrile state.

Vinegar is a good antidote in cases of poisoning by alkalies or their carbonates, producing the comparatively harmless acetates, and as it is kept in every household it is the handiest remedy in that unfortunately too frequent accident, the drinking of lye by children.

Vinegar is a styptic when applied directly to bleeding surfaces, but is not as effective as some of the iron preparations, for instance. Being easily obtained it may, however, often serve a useful purpose in emergencies until other remedies can be obtained.

A mixture of castor oil, vinegar, and water is a popular enema in fevers, especially in children, and this combination may also be used to expel threadworms from the rectum.

In excessive doses vinegar produces an anæmic condition which is frequently seen in chlorotic girls as a consequence of over-indulgence in pickles. The health may be permanently undermined and ruined by the excessive use of this condiment, and especially if mineral acids are contained in the vinegar to increase its acidity.

Dose.—For internal use from a tea- to a tablespoonful in water (5 to 15 cubic centimeters). For enemas a tablespoonful to a wineglassful, in water (15 to 60 cubic centimeters).

Acetum Aromaticum.

AROMATIC VINEGAR.

Gewürz Essig, G.; *Vinaigre Aromatique, Vinaigre Vulneraire*, F.; *Vinagre Antiseptico*, Sp.; *Kryddättika*, Sw.

Mix one cubic centimeter (16 minims) of each of spirit of rosemary, spirit of lavender, spirit of juniper, spirit of lemon, and spirit of peppermint ; ten cubic centimeters (160 minims) spirit of cloves ; fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) glacial acetic acid; twenty cubic centimeters

($\frac{2}{3}$ fluidounce) alcohol and sufficient distilled water to make the whole measure one hundred cubic centimeters ($3\frac{1}{3}$ fluidounces). Let the mixture stand five days, shaking it occasionally; then filter. To get a perfectly clear preparation it is well to first shake it with about four grams ($\frac{1}{8}$ ounce) filter-paper scraps.

It is very grateful, and much used as a cooling and cleansing application.

[The "Acetum Prophylacticum," or "Acetum Quatuor Latronum"—Vinaigre de quatre voleurs, F.; Vinagre de los cuatro ladrones, Sp.; or Four Thieves' vinegar, was a once celebrated preparation, made from one and one-half ounce each of southernwood, Roman wormwood, crisped mint, rosemary, rue, and sage; two ounces lavender flowers; one-fourth ounce each of sweet flag, cloves, and nutmeg, and one gallon vinegar. Sometimes a little camphor was added, previously dissolved in glacial acetic acid. It is said to have received its name from the fact of four persons, who robbed the dead bodies of the victims of a pestilence in Marseilles, being protected from the contagion by the use of this vinegar.]

Achillea.

ACHILLEA.

Millefolii Summitates.—Schafgarbe, Schafrippe, G.; *Millefeuille, Herbe aux charpentiers*, F.; *Milefolio, Milenrama*, Sp.; *Rölleka*, Sw.; *Yarrow, Milfoil.*

Origin.—*Achillea Millefolium*, Linné (Compositæ).

Habitat.—Northern hemisphere.

Parts used.—The flowering tops and the leaves.

Description.—The flower heads are flat, and consist of numerous greenish-white flowers; the leaves are from five to twenty-five centimeters (2 to 10 inches) long, pointed, pinnately cleft. Odor strong, aromatic, reminding of chamomile; taste, bitter. Should be free from coarse stems.

Constituents.—The flowers contain a small quantity of a blue or bluish-green *volatile oil.* A different volatile oil exists in other parts of the plant. The bitterness of the drug is due to *achillein*, which is a glucoside, amorphous, and soluble in water. There is also some tannin, resin, and traces of aconitic acid in the drug.

Medicinal Properties.—Achillea is an aromatic, bitter tonic, re-

sembling chamomile in its medicinal virtues, but with special effect upon the organs of the pelvis. It is a popular remedy in leucorrhœa and menorrhagia, and as these conditions are usually associated with general want of tone of the system, achillea, being a stomachic and stimulant, often proves beneficial.

ACHILLEÆ EXTRACTUM.

EXTRACT OF ACHILLEA.—EXTRACT OF YARROW.

Evaporate any desired quantity of the fluid extract, to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.50 gram (2 to 8 grains).

ACHILLEÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ACHILLEA.—FLUID EXTRACT OF YARROW.

To make five hundred cubic centimeters (or its equivalent, 17 fluidounces).

Use five hundred grams (or its equivalent, 17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol. Moisten the drug with two hundred and fifty grams (about 9⅜ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours; then percolate. Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-third grains; and each fluidrachm nearly fifty-seven grains.

Dose.—Two to five cubic centimeters (30 to 75 minims).

ACHILLEÆ INFUSUM.

INFUSION OF ACHILLEA.—INFUSION OF YARROW.

From thirty grams (1 avoirdupois ounce) of the drug make three hundred cubic centimeters (equal to about 10 fluidounces). (See directions on page 597.)

Dose.—Ten to fifteen cubic centimeters (2½ to 4 fluidrachms) at intervals of one or two hours.

Acidum Aceticum; U. S.

ACETIC ACID.

Essigsäure, G.; *Acide acétique*, F.; *Acido Acetico*, Sp.; *Ättiksyra*, Sw.

Acetic acid is now largely manufactured from wood. There are three different strengths of acetic acid in the new U. S. Pharmacopœia. The one bearing the title acetic acid has the specific gravity 1.048 at 15° C. (59° F.), corresponding to about 6.8° Baumé. One hundred pounds of this acetic acid contains thirty-six pounds absolute acetic acid ($HC_2H_3O_2$) and sixty-four pounds of water; or, which is the same, 30.55 pounds acetic anhydride ($C_4H_6O_3$) and 69.45 pounds water. Thus the acetic acid of the new Pharmacopœia is 2.86 per cent. stronger than the acetic acid of the Pharmacopœia of 1870, which contained thirty-five per cent. of absolute acetic acid, and had the specific gravity 1.047 corresponding to about 6.3° Baumé.

To neutralize ten grams of the official acetic acid requires six grams potassium bicarbonate. For *description and tests* see the Pharmacopœia, pages 9 and 10.

Unless acetic acid is quite up to the standard of the Pharmacopœia as to purity, it is liable to be extremely disagreeable to the taste when neutralized with an alkali or alkaline carbonate. (See ammonii acetatis liquor, page 121.)

Preservation.—Must be kept in glass-stoppered bottles.

ACIDUM ACETICUM DILUTUM; U. S.

DILUTED ACETIC ACID.

Mix one hundred and seventy grams (6 ounces) acetic acid with eight hundred and thirty grams (28 fluidounces) distilled water. This preparation is an acetic acid of 1.0083 specific gravity, corresponding to about 1.2° Baumé. It contains six per cent. absolute acetic acid, or nearly 5.1 per cent. acetic anhydride. This new diluted

acetic acid is, therefore, one-third stronger than the preparation of 1870 of the same title, which contained only four and one-half per cent. absolute acetic acid. The new diluted acetic acid of our Pharmacopœia (1880) is of the same strength as that of the German Pharmacopœia.

To neutralize ten grams of diluted acetic acid requires about one gram potassium bicarbonate.

ACIDUM ACETICUM GLACIALE; U. S.

Glacial Acetic Acid.

Eisessig, G.; *Vinaigre glacial*, F.; *Isättika*, Sw.

This acetic acid is solid at 15° C. (59° F.), having at that temperature a specific gravity of 1.056 to 1.058, corresponding to nearly 8° Baumé. It consists almost wholly of absolute acetic acid, the minimum strength allowed by the Pharmacopœia being ninety-nine per cent.

To neutralize ten grams of this acid will require not less than 16.7 grams potassium bicarbonate if the acetic acid be of standard strength.

There was no glacial acetic acid prescribed in the U. S. Pharmacopœia of 1870. Glacial acetic acid crystallizes into an ice-like mass, or only partially, so that while large transparent masses of crystals are formed, a portion of the acid still remains liquid, giving it the appearance of a supersaturated solution.

When glacial acetic acid is diluted with water the density (specific gravity) increases while the temperature falls until the mixture contains about seventy-seven to eighty per cent. of absolute acetic acid; when further diluted the specific gravity of the liquid decreases and the temperature rises. An acetic acid containing forty-seven per cent. absolute acetic acid has about the same specific gravity as the official glacial acetic acid, which is more than twice as strong. The fact that acetic acids of so widely different strengths still may have the same density renders it necessary to ascertain the strength of glacial acetic acid, and other strong acetic acids by other means. The safest way is to find the quantity of volumetric solution of soda, or the quantity of potassium bicarbonate, required to neutralize the acid.

Caution.—Glacial acetic acid is so destructive in its effects upon organic matter as to render it necessary to be cautious in handling it, as in removing the stopper from the containing bottle.

Solvent Properties.—Glacial acetic acid dissolves sulphur, phosphorus, ether, chloroform, gun-cotton, resins, gum-resins, volatile oils, camphor, etc., in greater or less proportions. According to Duflos, one gram acetic acid containing not more than four per cent. of water will

mix clear with one gram oil of cloves, or with ten centigrams oil of lemon.

Acetic Acids of Commerce.—The acid sold by chemical manufacturers as "No. 8" acetic acid is an impure acid of variable strength, but usually containing about twenty-nine per cent. absolute acetic acid, having the specific gravity 1.040. The so-called "C. P." acetic acid generally sold is of the same strength but less impure. Both are one-fourth weaker than the acid heretofore known to the drug trade as "U. S. P." acetic acid, specific gravity 1.047, containing thirty-five per cent. absolute acid. The commercial "glacial acetic acid" is usually about 1.065 specific gravity, and contains about ninety-five and one-half per cent. absolute acetic acid. Pure acetic acid is worth four or five times as much as "No. 8."

Medicinal Uses.—Acetic acid is seldom employed internally. The effects of the diluted acid are like those of vinegar, but as it is less grateful to the senses the latter is preferred. The glacial acetic acid is used for external application as a caustic, rubefacient or vesicant. As it has the property of slowly softening and dissolving dry epithelial cells, it is useful for the removal of accumulations of horny epithelial masses, as corns.

It is also used in some skin diseases of a parasitic nature, to destroy the animal or vegetable organisms which cause the disease. For this purpose it often requires dilution with an equal weight, or more, of glycerin.

On account of the pungent smell, the strong acetic acid, or preferably the glacial acetic acid, is useful when applied to the nostrils in cases of headache or syncope. The glacial acetic acid is often put up in "smelling-bottles."

ACIDUM ACETICUM AROMATICUM; G.

Aromatic Acetic Acid.

Mix thirty-four cubic centimeters ($1\frac{1}{8}$ fluidounce) oil of cloves, twenty-four cubic centimeters (6 fluidrachms) oil of lavender, twenty-four cubic centimeters (6 fluidrachms) oil of lemon, twelve cubic centimeters (3 fluidrachms) oil of bergamot, twelve cubic centimeters oil of thyme, four cubic centimeters (1 fluidrachm) oil of cassia, and ninety grams (3 ounces) glacial acetic acid. Macerate, shaking occasionally, until dissolved.

As a grateful contents of the smelling-bottle this preparation is used in headaches, fainting fits, and similar attacks. It is also used to disguise disagreeable odors in the sick-room.

Acidum Benzoicum; U. S.

BENZOIC ACID.

Flores Benzoës—Benzoesäure, Benzoeblumen, G.; *Acide benzoique, Fleurs de benjoin,* F.; *Acido Benzoico, Flores de Benjui,* Sp.; *Benzoesyra,* Sw.; *Natural Benzoic Acid, English Benzoic Acid.*

Description and Tests.—See the Pharmacopœia, page 11. The description and tests given exclude from medicinal use any other than the natural benzoic acid prepared from the benzoin by sublimation. It must be free from the odor of bitter almond or of stale urine belonging to impure artificial benzoic acid made from hippuric acid. Benzoic acid is also made from naphthalin by oxidation with nitric acid, when phthalic acid is formed, which when heated with lime gives benzoate of calcium. The calcium benzoate is then decomposed with hydrochloric acid. Lately benzoic acid is manufactured also from toluol.

A perfectly pure artificial benzoic acid, free from all odor, can be made, and the true odor of benzoin (always present in genuine natural benzoic acid) can be imparted to it by subliming it with a little benzoin. No test is known by which this artificial product can be distinguished from the true sublimed natural benzoic acid. Benzoic acid made from benzoin by boiling it with lime and then precipitating with hydrochloric acid is not fragrant. That made from the putrid urine of herbivorous animals retains a faint odor of urine.

In the American trade the true benzoic acid, made by sublimation from benzoin ("from gum benzoin") is known as "English benzoic acid," while the false is known as "German benzoic acid"—not because the English make more of the true than of the artificial acid, nor that natural benzoic acid is not made in Germany, but because the artificial acid was first made by German chemists.

The fragrant odor of true sublimed benzoic acid is due to volatile oil (ethyl benzoate). Many consider this as being the only medicinally active constituent of the official preparation. Even artificial benzoic acid is antiseptic in its properties, but these properties are not the only ones expected of benzoic acid. It is therefore clear that the natural sublimed acid, which is the only one containing the volatile oil (or ethyl benzoate), is the only one that should be used.

Solubility.—Benzoic acid is practically insoluble in pure cold water. It dissolves in fifteen parts boiling water. Borax aids its solution, one part benzoic acid and one part borax dissolving together in one hundred parts water.

Preservation.—The preparation must be kept in well-closed bottles and protected from the light.

Sold in the market in one-pound and one-ounce bottles. It takes a four-ounce bottle to hold one ounce. "English benzoic acid" fetches a twenty-five per cent. higher price than "German benzoic acid."

Medicinal Uses.—Benzoic acid, when taken internally, acts as a stimulant blennorrhetic upon the bronchial mucous membranes and increases the expectoration. It is therefore useful, either alone or with senega, squills, etc., in chronic bronchitis, especially that form known as "*dry catarrh*," or "*dry bronchitis*," which is accompanied by a distressing dyspnœa resembling asthma. A solution in the form of spray (atomization) is often used in chronic laryngeal and bronchial affections.

Benzoic acid (or benzoate of ammonium) is also useful in rendering ammoniacal urine acid, part of the medicine being eliminated with the urine as benzoic, part as hippuric acid. As alkaline urine is generally accompanied by irritation or inflammation of the lining membrane of the bladder (*cystitis*), and may be accompanied with incontinence of urine or the deposits of phosphates (phosphatic calculi), these symptoms and consequences may be removed and avoided by this medicine. Even should phosphatic calculi (*gravel* or *stone in the bladder*) have been formed, they may often be redissolved by a long-continued use of the benzoic acid.

Benzoic acid also possesses valuable antiseptic properties, and solutions have been employed with good results in dressing foul ulcers and sores.

Dose.—From 0.5 to 2.5 grams (10 to 40 grs.) once or twice a day, or in smaller doses more frequently repeated.

Acidum Boricum; U. S.

Boric Acid.

Acidum Boracicum, Sal Sedativum Hombergii—Borsäure, G.; *Acide borique*, F.; *Acido Borico*, Sp.; *Borsyra*, Sw.; *Boracic Acid.*

Description and Tests.—See the Pharmacopœia, pages 11 and 12. It is soluble in four parts of glycerin.

Medicinal Uses.—Boric acid possesses powerful antiseptic properties, and being at the same time mild and harmless, and absolutely non-irritant when pure, it is often preferred to carbolic acid. Lister

uses it extensively. In order to be effective it must be in actual contact with the surface which it is intended to purify or keep healthy. It should be used either in solution made from thirty grams (or 1 ounce) boric acid to one liter (or 1 quart) of water, or in the form of impalpable powder.

Lint dipped in a boiling saturated solution of boric acid in water, and then dried, forms an excellent antiseptic dressing.

ACIDI BORICI UNGUENTUM.

BORIC ACID OINTMENT.

Mix fifteen grams (½ ounce) boric acid in fine powder with ninety grams (3 ounces) petroleum ointment, triturating until perfectly smooth.

An antiseptic dressing for wounds, ulcers, etc.

Acidum Carbolicum ; U. S.

CARBOLIC ACID.

Phenol. — *Acidum Phenicum ; Acidum Phenylicum* — *Carbolsäure, Phenylsäure, Phenylalkohol,* G.; *Acide phenique, Acide carbolique, Hydrate de phenyle,* F.; *Acido Carbolico,* Sp.; *Karbolsyra, Phenylalcohol, Phenol,* Sw.; *Phenol, Phenic Acid, Phenylic Acid, Phenyl Hydrate, Phenylic Alcohol, Pure Crystallized Carbolic Acid.*

Description and Tests.—See the Pharmacopœia, page 12.

This extensively used substance is not an acid, although so called. It doubtless derived its improper name from its corrosive properties. Instead of being an acid, it belongs to the alcohol series of chemical compounds, and its proper name is phenol.

The pinkish tint which pure carbolic acid sometimes acquires when exposed to light or air may be due to traces of anilin, pyrrhol, or some other related bodies. It does not in the least detract from the medicinal value or strength of the article.

Carbolic acid does not redden blue litmus paper.

It should be hard and comparatively dry. In dry, cool weather the crystallized acid scarcely becomes moist, even when exposed to the air, but when the temperature is above 15° C. (59° F.) the commercial carbolic acid is apt to be more or less moist, even in a well-corked or glass-stoppered bottle.

One part by weight of warm water will mix perfectly with from four to nine parts of melted carbolic acid, and the mixture may even remain perfect at summer temperatures, but the mixture partly separates at temperatures below 5° C. (41° F.) if more than seven parts of crystallized acid was added.

A mixture of one part crystallized carbolic acid with twenty parts water will mix clear with any additional quantity of water.

carbolic acid dissolves in seven parts olive oil ; seven parts dissolves in two parts glycerin ; five parts in one part alcohol ; four parts in one part ether ; three parts in one part chloroform.

Solution of chlorinated lime takes away the odor of carbolic acid.

Medicinal Uses.—Carbolic acid is a powerful antiseptic and disinfectant. It prevents the growth of and destroys the minute organisms on which fermentation, putrefaction, and many of the infectious diseases are supposed to depend. Carbolic acid is valuable as a disinfectant of alvine discharges in cholera, typhoid fever, etc., and for the purification of water-closets, sewers, and drains.

It is often used in the form of a one or 2.5 per cent. solution as a wash for the hands and instruments of the surgeon and his assistants, before proceeding to an operation, while the air is kept charged with a spray of the same solution during the operation. The dressings of the wound are also impregnated with the carbolic acid. This treatment, which has proved of great value, especially in abdominal surgery when the peritoneum is exposed, is not without danger, as a number of deaths have been observed from the absorption of the acid and the consequent carbolic acid poisoning.

This substance is often applied to foul ulcers, and prevents suppuration by preventing the proliferation of pus corpuscles. For this purpose it may be applied in solution in water or oil, the latter method being less liable to give rise to symptoms of absorption and poisoning. It hardens and corrugates the surface of the ulcer, hastening cicatrization, but its power to prevent cell-formation and cell-life is also apt to interfere with the proper formation of granulations when this process is necessary to supply a deficiency of tissue, and in such cases carbolic acid may delay the healing process, or even prove injurious by causing the deterioration and breaking down of granulations already formed.

It is also used as an external application in gangrene and small-pox.

It is a local anæsthetic, and when applied to the skin whitens it and renders it insensible, so that small operations, like opening abscesses, may be performed without pain.

In weak solution it is also employed as a gargle and mouth-wash in putrid sore throat, diphtheria, or in foul breath from carious teeth, etc.; also as a spray in phthisical or other lung troubles, gangrene of the lungs, and chronic bronchitis, if they are accompanied by purulent or offensive expectoration.

Internally it has been given, but without any great benefit, in various infectious and zymotic diseases, as scarlatina, small-pox, and also in malarial fevers.

In larger quantities it acts as an irritant poison, corroding the stomach,

forming eschars surrounded by intense congestion and inflammation. It also produces stupor or coma and convulsions, followed by death. The local effects on the stomach should be counteracted by administering large quantities of white of egg, milk, oil, mucilage, etc., of which the first mentioned is most effective. Opium, cooling demulcent drinks, and appropriate diet must be given for some time, until convalescence from the inflammatory action has occurred. As its escharotic action is rather superficial, it is not so liable to be followed by subsequent constriction of the œsophagus as after swallowing of lye and some other corrosive poisons.

The cerebral effects must be combated with cold douches and with counter-irritation and stimulation, the latter being made by subcutaneous injection of ether, ammonia, or musk, if the patient cannot swallow.

If taken in large quantities the effect is often exceedingly rapid, and death may result before any efforts to help can be made.

In cases where strong carbolic acid by accident comes in direct contact with any part of the body, it should be immediately washed off with warm water. Loss of the eyesight or other serious results might follow from a careless handling of it.

Dose.—0.03 to 0.06 gram (one-half to one grain) two to four times daily, and made into a pill with soap or marshmallow powder and tragacanth, or suspended in emulsion or mucilage (0.06 to 0.125 gram to 30 cubic centimeters ; 1–2 grains to 1 fluidounce).

ACIDUM CARBOLICUM LIQUIDUM PURUM.

Pure Liquid Medicinal Carbolic Acid.

This is a clear, colorless solution of ninety-five parts crystallized carbolic acid in five parts distilled water, or nineteen parts in one part. It is called "ninety-five per cent. medicinal carbolic acid" in the trade. It does not mix clear with an additional quantity of water unless at least one-fourth as much by weight as the crystallized acid used be added, when it will become clear again.

One minim of this liquid represents one grain of crystallized acid.

ACIDI CARBOLICI SOLUTIO.

"Carbolic Acid Solution, No. 1."

This is a clear, colorless, eighty per cent. solution of crystallized carbolic acid in distilled water, made by mixing four parts melted carbolic acid with one part of warm distilled water.

Carbolic Acid Spray consists of a solution of one-eighth to one-half ounce crystallized carbolic acid in one pint of water.

When carbolic acid is used for *inhalation* it is most convenient to dilute the liquid medicinal carbolic acid (95 per cent.) to the requisite strength. Fifteen to twenty drops of the liquid medicinal carbolic acid may be diluted with one pint water, to be used warm (60° C., or 140° F.). For "dry inhalation" the liquid acid is used without dilution, the patient inhaling the fumes which arise spontaneously from the vessel.

For a *gargle* a solution of one to two grains crystallized carbolic acid to each fluidounce of water is used.

As an *injection*, one grain to four fluidounces.

Carbolized Oil is a solution of one ounce crystallized carbolic acid in twenty ounces olive oil, or linseed oil.

The carbolized oil in which catgut ligatures are preserved is made of one ounce crystallized carbolic acid to four ounces linseed oil.

For *hypodermic injection* three-fourths grain of crystallized carbolic acid in twenty drops of water is used (Squire).

Carbolic Acid Camphor.—This is an oily liquid, prepared by dissolving two hundred and fifty grams powdered camphor in a solution made of ninety grams crystallized carbolic acid and ten grams alcohol. It is miscible in all proportions with alcohol, ether, and sweet oil of almonds.

Iodized Phenol consists of fifteen grams (½ ounce) iodine and thirty grams (1 ounce) crystallized carbolic acid, mixed by the aid of gentle heat.

Liquid Iodized Phenol consists of fifty-five grams iodized phenol, thirty-five grams crystallized carbolic acid, and ten grams water.

ACIDUM CARBOLICUM CRUDUM; U. S.

Crude Carbolic Acid.

An impure, somewhat colored phenol, contaminated with cresylic acid or cresol. It should not contain more than five per cent. water. The well-known "Calvert's Carbolic Acid, No. 5" well represents the kind intended to be used under the name of crude carbolic acid. There are several manufacturers in the United States who make similar acid fully equal to Calvert's, and at a less cost. For *description and tests* see the Pharmacopœia, pages 12 and 13.

Crude carbolic acid is intended for free use as a disinfectant in hospital wards, out-houses, alleys, water-closets, drains, etc.

The following mixture is much used:

Disinfectant of Copperas and Carbolic Acid.—Dissolve two thou-

sand grams (about 70 ounces avoirdupois) copperas and three hundred grams (about 10½ ounces avoirdupois) crude carbolic acid in fifteen liters (about 4¼ gallons) of water.

ACIDI CARBOLICI AQUA; Phar. 1870.

Carbolic Acid Water.

Was prepared by mixing ten fluidrachms of glycerite of carbolic acid with fourteen and three-fourths fluidounces of distilled water. Practically it contains one-fourth ounce crystallized carbolic acid in sixteen fluidounces. A convenient way to prepare it is to mix one-fourth ounce crystallized carbolic acid with one-fourth ounce glycerine in a mortar, and then to add sixteen fluidounces of distilled water.

Used as a wash, gargle, spray, or for internal use.

One fluidrachm contains about one grain of the acid.

Dose.—One to two fluidrachms (4 to 8 cubic centimeters) two or three times daily.

ACIDI CARBOLICI GLYCERITUM; Phar. 1870.

Glycerite of Carbolic Acid.

Glycerin and crystallized carbolic acid can be combined in all proportions by triturating them together, forming a clear solution. Such a solution containing equal parts of the two substances is miscible with water in all proportions.

The glycerite of carbolic acid of the United States Pharmacopœia (1870) was a solution of one troy ounce crystallized carbolic acid in four fluidounces of glycerin.

It is used as an external application. Carbolic acid water was prescribed in the United States Pharmacopœia of 1870 to be made from the glycerite.

ACIDI CARBOLICI SUPPOSITORIA.

Carbolic Acid Suppositories.

Each suppository contains one grain crystallized carbolic acid and thirty grains cacao butter; or one grain of the acid with fifteen grains powdered castile soap and three and one-half grains glycerite of starch (Squire).

ACIDI CARBOLICI UNGUENTUM; U. S.

CARBOLIC ACID OINTMENT.

Mix thirty grams (1 ounce) crystallized carbolic acid intimately with two hundred and seventy grams (9 ounces) simple ointment.

Must be made fresh whenever wanted for use.

Acidum Chromicum; U. S.

CHROMIC ACID.

Chromsäure, G.; *Acide chromique*, F.; *Acido Chromico*, Sp.; *Kromsyra*, Sw.

Must be kept in glass-stoppered bottles.

Description and Tests.—See the Pharmacopœia, page 13.

It is usually very much contaminated with sulphuric acid, and never entirely free from it. Being, however, used only externally as an escharotic, caustic, or antiseptic, a small quantity of sulphuric acid does not condemn the preparation.

It dissolves perfectly in less than its own weight of water.

Medicinal Uses.—Used to remove venereal growths on the genitals, and to destroy superficial parasitic eruptions of the skin, such as barber's itch, etc. Its action is not very deep, and it is therefore also used to stimulate chronic ulcers. Gynecologists use it as an application to the neck of the womb in cancers and ulcers of that organ. Chromic acid is also used to remove warts and other growths on the skin and mucous membranes.

Strong solutions should be applied with a glass rod, but weaker solutions may be applied with a camel's-hair brush which must immediately thereafter be well washed in water.

A dilute solution of one-half to two per cent. in strength is much used by microscopists to harden histological or pathological specimens which it is desired to cut in thin sections. This method of hardening is especially valuable for nervous tissues.

Acidum Chrysophanicum.

CHRYSOPHANIC ACID.

The substance used under the above name in the treatment of skin diseases is chrysarobin, which see.

True chrysophanic acid is found in some lichens, in rhubarb, rumex, etc., of which it is the principal coloring matter. When pure it is obtained in bright yellow crystals.

Acidum Cinnamicum.

CINNAMIC ACID.

Zimmtsäure, G.; *Acid Cinnamique*, F.; *Acido Cinnamico*, Sp.; *Kanelsyra*, Sw.

An aromatic acid existing in the balsams of Peru, Tolu, and Storax. It is also found in old resinified oil of cinnamon. At present it is prepared in large quantities artificially by Schering of Berlin. It resembles benzoic acid in appearance and properties, and is attracting attention as an antiseptic.

True cinnamic acid may be conveniently prepared from old, hard balsam of tolu, by boiling the tolu with water and lime, filtering while hot, and immediately precipitating with hydrochloric acid.

Acidum Citricum; U. S.

CITRIC ACID.

Citronensäure, G.; *Acide citrique, Acide du citron*, F.; *Acido Citrico*, Sp.; *Citronsyra*, Sw.

Description and Tests.—See the Pharmacopœia, pages 13 and 14. Permanent in the air at ordinary temperatures if pure. Soluble in twice its weight of glycerin.

To *neutralize* ten grams citric acid dissolved in water requires fifteen grams potassium bicarbonate; twelve grams potassium carbonate; twelve grams sodium bicarbonate; twenty-one grams crystallized sodium carbonate ; 7.4 grams ammonium carbonate ; 24.2 grams water of ammonia ; 8.6 grams stronger water of ammonia ; 7.8 grams magnesium carbonate ; or, 6.7 grams magnesia.

Density of Solutions.—According to Schiff the specific gravities of solutions of citric acid of different strengths are as follows:

A four per cent. solution has the specific gravity 1.0150; an eight per cent. solution has the specific gravity 1.0306; a twelve per cent. solution has the specific gravity 1.0470; a sixteen per cent. solution has the specific gravity 1.0634; a twenty-four per cent. solution has the specific gravity 1.0979; a thirty-six per cent. solution has the specific gravity 1.1540; a fifty per cent. solution has, according to Gerlach, the specific gravity 1.2204, and a sixty per cent. solution the specific gravity 1.2738.

Aqueous solutions of citric acid soon become mouldy.

Original Packages of citric acid are kegs containing one hundred and twelve pounds each.

Medicinal Uses.—Citric acid is a remedy of great value in *scurvy*, and in the form of lime-juice is used as a preventive of that disease on vessels that are on the sea for any length of time. It is also used as a refrigerant, and forms a grateful drink for feverish patients, on account of its power to allay thirst. In the form of lemon-juice it enjoys the popular reputation of curing and preventing "*biliousness.*" It is given in sweetened water to suit the taste.

Artificial Lemon-juice is made by dissolving thirty grams (1 ounce) citric acid in four hundred grams (13½ fluidounces) water.

Artificial Lemonade is prepared by dissolving sixty grams (2 ounces) citric acid in one thousand cubic centimeters (34 fluidounces) water, and adding two hundred and fifty grams (8¾ ounces) sugar previously rubbed up with ten drops of oil of lemon.

ACIDI CITRICI SYRUPUS; U. S.

Syrup of Citric Acid.

Mix four grams (80 minims) spirit of lemon with nine hundred and eighty grams (25⅓ fluidounces) simple syrup in a liter (or quart) bottle. Add gradually eight grams (124 grains) citric acid dissolved in eight grams (2 fluidrachms) water, shaking the bottle after each addition, until all is thoroughly mixed. The final product should weigh one thousand grams (35 ounces 120 grains), and will measure about seven hundred and sixty cubic centimeters (25½ fluidounces).

Acidum Cresylicum.

Cresol.—Cresylic Acid.—Cresyl Alcohol.

This is an uncrystallizable, clear, colorless liquid when pure. As usually sold it has a reddish tint. It is a coal-tar product which always accompanies impure carbolic acid. A mixture of equal parts of pure carbolic acid and glycerin can be diluted in any proportions with water, forming a clear mixture, but cresylic acid forms a turbid mixture when similarly treated.

Cresylic acid is a powerful disinfectant, perhaps more powerful than carbolic acid. Its medicinal properties, as far as known, are similar to those of phenol. Used as a vapor by heating over a small lamp.

Acidum Formicicum.

FORMIC ACID.

Ameisensäure, G.; *Acide formique*, F.; *Myrsyra*, Sw.

A colorless liquid of a pungent acid odor. It mixes readily with water and alcohol. When applied to the skin it causes a burning sensation, acting as an irritant poison and producing blisters.

The stinging effect of the hairs of nettle, and of the stings of certain insects, are caused by formic acid, which is also present in and has derived its name from red ants.

Properties.—Stimulant.

SPIRITUS FORMICARUM; G.

Macerate five hundred grams (17⅔ ounces) bruised red ants with seven hundred and fifty cubic centimeters (1½ pint) water and eight hundred cubic centimeters (about 34 fluidounces) alcohol for two days in a retort. Then distil off one thousand grams (35⅓ ounces).

Dose.—1 to 4 cubic centimeters (15 to 60 minims).

Acidum Gallicum; U. S.

GALLIC ACID.

Gallussäure, G.; *Acide gallique*, F.; *Acido Gallico*, Sp.; *Gallusyra*, Sw.

Description and Tests.—See the Pharmacopœia, page 14. It dissolves in twenty times its weight of glycerin. An alcoholic solution mixes clear with water in all proportions, but turns brown by keeping.

Sold in one-pound boxes and in one-ounce bottles. It requires a four-ounce bottle to hold one ounce.

Medicinal Uses.—For internal use gallic acid is to be preferred to tannic acid, as the latter is changed to gallic acid in the blood. For hemorrhage from the kidneys, gallic acid is the best remedy we possess. It is not styptic when employed externally, and therefore cannot be substituted for tannic acid when we desire the local effect.

Dose.—0.06 to 0.65 Gram (1 to 10 grains).

ACIDI GALLICI GLYCERITUM.

GLYCERITE OF GALLIC ACID.

Dissolve thirty grams (1 ounce) gallic acid in one hundred and fifty grams (5 ounces, or about 4 fluidounces) glycerin by the aid of heat. On cooling, a portion of the gallic acid separates, and must be removed, as it does not re-dissolve.

ACIDI GALLICI UNGUENTUM; U. S.

OINTMENT OF GALLIC ACID.

Mix thoroughly thirty grams (1 ounce) gallic acid and two hundred and seventy grams (9 ounces) benzoinated lard. Use a horn spatula, as iron would discolor the product.

Acidum Hydriodicum.

HYDRIODIC ACID.

Jodwasserstoffsäure, G.; *Acide iodhydrique*, F.; *Acido iodohidrico*, Sp.; *Jodvätesyra*, Sw.—*Solution of Hydrogen Iodide.*

This is hydrogen iodide dissolved in water. The acid contains over ninety-nine per cent. iodine. A ten per cent. strong acid would thus contain nearly ten per cent. iodine. The hydriodic acid, formerly official in the United States, had a specific gravity of 1.112, and contained fifteen per cent. iodide of hydrogen, or nearly fifteen per cent. iodine. It should be colorless and clear. As the bromine strength of hydrobromic acid is greater than that of any other bromide, so is the iodine strength of hydriodic acid greater than that of any other iodide. Hence their use in medicine.

Hydriodic acid does not keep. It turns reddish brown from free iodine. The addition of a small quantity of hyposulphite of sodium is said to retard the decomposition. The only preparation of hydriodic acid fit for use (on pharmaceutical grounds) is the syrup.

ACIDI HYDRIODICI SYRUPUS; U. S.

SYRUP OF HYDRIODIC ACID.

Dissolve ten grams (154 grains) iodine in eighty grams (measuring about $3\frac{1}{3}$ fluidounces) alcohol, in a loosely stoppered chemical flask, using very gentle heat to avoid loss of iodine by vaporization. Add the solution to one hundred and fifty grams (5 ounces 127 grains)

simple syrup previously mixed with one hundred and fifty grams (5 fluidounces) water. Put the mixture in a tall glass vessel, shake well, and then pass into it a current of hydrosulphuric acid gas until it turns a purely yellowish color and no longer gets brown on shaking it. Filter the liquid through white filter paper, returning what passes until it comes through clear. Wash the filter with a little distilled water, and evaporate the filtrate and washings in a weighed porcelain dish on a water-bath at not over 55° C. (131° F.), stirring constantly, until all odor of hydrosulphuric acid has been removed. Now set the evaporating dish aside until the contents are cool. Then add five grams (77 grains) spirit of orange and four hundred grams (14 ounces 48 grains) sugar, and enough water to make the whole weigh one thousand grams (35 ounces 120 grains). When the sugar has dissolved (without the aid of heat) strain the syrup through a plug of loose cotton put in the stem of a funnel, keeping the latter covered.

Preservation.—Fill the product in bottles holding not more than two hundred and forty cubic centimeters (8 fluidounces) each, which must be quite filled and corked with corks dipped in melted paraffin or wax. Keep these bottles in a cool, dark place. The preparation is not easily made to keep well.

Description and Tests.—See the Pharmacopœia, page 318. It contains one per cent. absolute hydriodic acid, or nearly one per cent. iodine (combined).

Dose.—One to five cubic centimeters (15 to 75 minims).

Acidum Hydrobromicum.

Hydrobromic Acid.

Bromwasserstoffsäure, G.; *Acide bromhydrique*, F.; *Acido bromohidrico*, Sp.; *Bromvätesyra*, Sw.—*Solution of Hydrogen Bromide.*

The official hydrobromic acid is:

ACIDUM HYDROBROMICUM DILUTUM; U. S.

Diluted Hydrobromic Acid.

This is a pure acid of ten per cent. strength.

Description and Tests.—See the Pharmacopœia, page 14. When first introduced into medicine in this country the acid was made of ten per cent. strength by decomposing eighty grains potassium bromide with one hundred grains of tartaric acid. This preparation was impure, containing both potassium bitartrate and undecomposed potassium

bromide. The hydrobromic acid gained its reputation as a remedy by the use of a ten per cent. acid, and this would seem to be sufficiently strong. Absolute hydrobromic acid is hydrogen bromide, containing ninety-eight and three-fourths per cent. bromine and one and one-fourth per cent. hydrogen. It contains more bromine than any other bromide. Potassium bromide contains about two-thirds of its weight of bromine, and lithium bromide about ninety-two per cent. Dr. Squibb prepares a hydrobromic acid containing thirty-four per cent. of hydrogen bromide (or absolute hydrobromic acid), which represents one-half the bromine strength of an equal weight of potassium bromide, Squibb's hydrobromic acid containing 33.58 per cent. bromine, and the potassium bromide containing 67.17 per cent.

Hydrobromic acid keeps well when pure. Should be put in glass-stoppered bottles.

Medicinal Uses.—It is useful in the same kind of cases in which bromide of potassium is indicated. Headache, accompanied by congestion of the brain, as evidenced by the beating and throbbing of the pulsations, is readily relieved by it; also, the tinnitus aurium experienced after taking quinine. It fails to do good in epilepsy.

Dose.—Of the diluted acid, from 2 to 4 cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Acidum Hydrochloricum; U. S.

HYDROCHLORIC ACID.

Acidum Hydrochloratum; Acidum Muriaticum; Acidum Chlorhydricum—Salzsäure, G.; *Acide chlorhydrique, Acide muriatique*, F.; *Acido chlorohidrico, Acido hidrochlorico, Acido muriatico*, Sp.; *Saltsyra, Klorvätesyra*, Sw.; *Muriatic Acid, Hydrogen Chloride.*

Description and Tests.—See the Pharmacopœia, pages 14 and 15. Hydrochloric acid is commonly called muriatic acid. The old name, "spirit of salt," is rarely used any more. The U. S. Pharmacopœia does not sanction the use of commercial hydrochloric or muriatic acid for medical or pharmacal purposes, requiring the chemically pure in all cases.

The official or "U. S. P." acid is, therefore, a "C. P." acid. It has 1.16 specific gravity, and contains 31.9 per cent. hydrochloric acid gas (chloride of hydrogen). Chemical manufacturers sell it in one-pound bottles and in six-pound bottles, under the designation of C. P. muriatic acid of 20° Baumé strength. The "muriatic acid" of the Pharmacopœia of 1870 was of the same strength.

Commercial muriatic acid is usually very impure, containing arsenic, iron, and sulphuric and sulphurous acids. It is used in the arts, and sold for this purpose by all druggists. Manufacturers sell several grades of it, viz.: 18° Baumé = 1.14 specific gravity = twenty-eight per cent. absolute acid; 20° Baumé = 1.16 specific gravity = thirty-two per cent. absolute acid; and 22° Baumé = 1.18 specific gravity = 35.5 per cent. absolute hydrochloric acid. Carboys of muriatic acid contain about one hundred and twenty pounds each.

Strong hydrochloric acid gives off white vapors in the air. This is partly due to the difference in percentage of moisture in the air and in the acid, and partly to the ammonia contained in the atmosphere, which, when it meets the hydrochloric acid forms a light cloud of chloride of ammonium.

Bottles containing hydrochloric acid, or other acids, frequently become covered with a light cloud or coat which is easily wiped or washed off. This is ammonium salt, formed from the ammonia in the air uniting with the vapors passing off from the acid bottle.

Glass-stoppered bottles are necessary for keeping hydrochloric acid.

Medicinal Uses.—Mineral acids have certain properties in common. In a concentrated form they are highly corrosive escharotics, which abstract water with great avidity from the tissues.

Hydrochloric acid aids digestion. A gland is stimulated by applying to the opening of its duct a solution of an opposite reaction to that of its secretion, and its action is diminished by an application of the same reaction as that of its secretion.

In *heartburn*, due to excessive secretion of gastric juice, alkaline treatment, as magnesia or bicarbonate of soda, is only palliative, since it merely neutralizes the acidity of the gastric juice, while it rather augments than diminishes the amount of it. If given at all in such a case, such substances should be given after meals.

It is better to give diluted hydrochloric acid *before* meals, when it will check the flow of gastric juice and cure the trouble.

In atonic dyspepsia, which is due to a diminished secretion of gastric juice, the reverse is true. The hydrochloric acid must be given *after* meals to assist the digestion.

Hydrochloric acid largely diluted with sweetened water forms an excellent drink to allay thirst and increase the appetite and digestion in fevers, especially during convalescence. Externally it is occasionally employed as a local escharotic in syphilitic ulcers, mucous patches, etc. It is given in the form of the diluted acid.

Poisonous Effects.—If taken in concentrated form it destroys the

mucous membrane of the mouth, pharynx, epiglottis, œsophagus, and stomach, producing intense pain and distress. As antidotes we give magnesia, chalk, soda, lime, soap, etc., to neutralize the acid, and albumen, oil, milk, etc., to mechanically protect the tissues. Calcined magnesia is preferable to the carbonates, because the liberated carbonic acid may distend and rupture the corroded walls of the stomach. After-treatment—opium, stimulants, etc.

ACIDUM HYDROCHLORICUM DILUTUM; U. S.

DILUTED HYDROCHLORIC ACID.

Diluted Muriatic Acid, Phar., 1870.

Mix sixty grams (2 ounces 50½ grains) of hydrochloric acid with one hundred and thirty grams (4⅓ fluidounces) distilled water.

Description and Tests.—See the Pharmacopœia, page 15. It contains ten per cent. of absolute hydrochloric acid or hydrogen chloride; has the specific gravity 1.049, corresponding to 7° Baumé; and is about thirty per cent. stronger than the "diluted muriatic acid" of the Pharmacopœia of 1870, which had a specific gravity of 1.038, containing 7.7 per cent. of absolute acid.

Dose.—From 0.3 to 1.50 cubic centimeter (5 to 25 minims), largely diluted, and taken through a straw or a glass tube to prevent the acid from injuring the teeth.

Acidum Hydrocyanicum Dilutum; U. S.

DILUTED HYDROCYANIC ACID.

Acidum Hydrocyanatum; Acidum Borussicum—Cyanwasserstoffsäure, Blausäure, G.; *Acide cyanhydrique, Acide hydrocyanique*, F.; *Acido cianhidrico, Acido hidrocianico, Acido Prusico*, Sp.; *Cyanvätesyra, Blåsyra*, Sw.; *Prussic Acid.—Solution of Hydrogen Cyanide.*

Extremely poisonous, and never administered alone.

Description and Tests.—See the Pharmacopœia, pages 15 and 16. The official preparation contains two per cent. hydrogen cyanide. Keeps well in small bottles—about thirty cubic centimeters capacity, or one fluidounce—with well-ground glass stoppers, in a cool, dark place.

The alternate formula of the Pharmacopœia for preparing diluted hydrocyanic acid from cyanide of silver by decomposition with hydrochloric acid yields a perfectly pure product, but seems to be superfluous. It is not probable that any considerable number of pharmacists ever make their own hydrocyanic acid, and a physician who is unable to find hydrocyanic acid in a case of emergency, would be even more likely to fail to find cyanide of silver.

Scheele's Hydrocyanic Acid, so called, which is sometimes called for even now, contains five per cent. absolute hydrocyanic acid, being thus two and one-half times the strength of the U. S. P. preparation.

Medicinal Uses.—Hydrocyanic acid is a most powerful poison. Even the inhalation of its vapor has resulted in death. For medicinal use only the diluted acid can be employed. In small or medicinal doses its action is that of a calmative or sedative. It is a valuable remedy in certain affections depending upon an irritation of the pneumogastric nerve; in *nervous vomiting*, *of pregnancy*, or *of cerebral disorders*, or the reflex vomiting of *phthisis* which occurs after severe spells of coughing; also in *irritable cough* or *whooping-cough;* some forms of *dyspepsia*, *gastralgia*, etc.

Applied externally it allays itching in *urticaria*, *lichen*, or *pruritus*, *pruritus ani* or *vulvæ*, etc. For this purpose it may be used by diluting one-half to one fluidrachm of the diluted acid with eight fluidounces of infusion (cold process) of marshmallow or sassafras pith, or in an emulsion of almonds.

Poisonous Effects.—It is very rapidly absorbed, and if taken in a large dose the effect is perceptible in a few seconds, while death may result within four or five minutes. The symptoms are sudden giddiness almost instantly followed by insensibility, cold extremities, clammy sweat, slow, jerking respiration, and very feeble pulse. If the effects are slower, convulsions, lockjaw, and opisthotonus may occur.

Antidotes and Treatment.—All chemical antidotes are worthless, as they are absorbed much too slowly. If the dose was large, the probability is that all help will be too late. The treatment consists in cold douches and affusions to the head and spine, and the inhalation and hypodermic injection of ammonia.

Dose.—1 to 3 minims (0.05 to 0.20 cubic centimeter) several times a day in some neutral vehicle.

For inhalation a mixture of ten to fifteen minims of diluted acid in sixty minims of water is used (0.66 to 1.0 cubic centimeter in 4 cubic centimeters water.)

HYDROCYANATA EMULSIO.

HYDROCYANATED EMULSION.

Beat twenty-five grams (386 grains) blanched sweet almond in a mortar with enough water, gradually added, to obtain two hundred and twenty-five cubic centimeters (7½ fluidounces) emulsion, to which add twenty-five cubic centimeters (6¾ fluidrachms) simple syrup. Macerate with this during one hour three grams (46 grains) amygdalin, shaking briskly from time to time.

During the maceration hydrocyanic acid is formed, the quantity of which is accurately estimated from the quantity of amygdalin used. Prepared as here indicated, the preparation contains two centigrams of anhydrous hydrocyanic acid in every thirty cubic centimeters (nearly one-third grain in each fluidounce.)

This is a reliable hydrocyanic acid preparation when made freshly as required for use.

Dose.—2 to 5 cubic centimeters (30 to 75 minims).

Acidum Hypophosphorosum.

HYPOPHOSPHOROUS ACID.

Prepared by decomposing hypophosphite of calcium with oxalic acid. It is a colorless acid liquid, containing, as commonly made, about ten per cent. of the acid (hydrogen hypophosphite), each fluidrachm representing six grains hypophosphorous acid, containing two and one-fourth grains of combined phosphorus. It is hardly ever used except for the preparation of syrups and solutions of the hypophosphites.

Dose.—0.6 to 4 cubic centimeters (10 to 60 minims).

Acidum Lacticum; U. S.

LACTIC ACID.

Milchsäure, G.; *Acide lactique*, F.; *Mjölksyra*, Sw.

Description and Tests.—See the Pharmacopœia, pages 16 and 17. It has the specific gravity 1.212, corresponding to nearly 25.5° Baumé, and contains seventy-five per cent. absolute lactic acid, being of the same strength as in the Pharmacopœia of 1870. Should be kept in glass-stoppered bottles.

"*Lacto-Phosphates*" are simply solutions of phosphates in lactic acid. "Lacto-phosphate of lime" is, when properly made, phosphate of calcium dissolved in lactic acid.

"*Lacto-Peptin*" is a mixture the published formula of which is remarkable. The popularity of the preparation is probably due to the fact that it contains some free lactic acid, which aids the digestive power of the principal constituent, pepsin.

Medicinal Uses.—This acid is a valuable aid in impaired digestion, atonic dyspepsia, and that form of the latter disease accompanied by diarrhœa in which the stools contain undigested food. It may be combined with pepsin.

In *heartburn* it may be given *before* meals, like hydrochloric acid, but is preferable to the latter as it is one of the natural ingredients of the gastric juice.

A solution of one part in sixteen parts of water is an excellent solvent of false membranes in croup or diphtheria. It may be applied with a probang or brush if the membranes do not extend into the larynx, or as a spray by inhalation if they do.

Dose.—One to two cubic centimeters (15 to 30 minims), in sweetened water.

Acidum Nitricum; U. S.

Nitric Acid.

Acidum azoticum—Salpetersäure, G.; *Acide azotique, Acide nitrique*, F.; *Acido Nitrico*, Sp.; *Salpetersyra*, Sw.

Description and Tests.—See the Pharmacopœia, page 17. The official nitric acid of the U. S. Pharmacopœia is a chemically pure acid of 1.42 specific gravity, corresponding to 43° Baumé. It contains 69.4 per cent. absolute nitric acid, and is of the same strength as the nitric acid of the Pharmacopœia of 1870. Should be quite colorless. It is extremely corrosive.

Commercial nitric acid is very impure, containing sulphuric acid, chlorine, and iron, and is usually more or less colored. It is sold in one-pound glass-stoppered bottles and in seven-pound glass-stoppered bottles, and also in carboys of about one hundred and twenty to one hundred and forty pounds each, the strength of the acid usually sold being 36° Baumé, or 1.33 specific gravity, containing fifty-two per cent. absolute acid; 38° Baumé, or 1.355 specific gravity, containing fifty-seven per cent.; 40° Baumé, or 1.38 specific gravity, containing 61.5 per cent.; 41° Baumé, or 1.39 specific gravity, containing sixty-two per cent.; 42° Baumé, or 1.41 specific gravity, containing 67.5 per cent.; and 43° Baumé, or 1.42 specific gravity, containing 69.4 per cent. of absolute

nitric acid. The commercial acid is unfit for pharmacopœial or medicinal uses.

Nitric acid must be kept in glass-stoppered bottles.

Fuming Nitric Acid is a very strong nitric acid containing hyponitric acid which escapes as reddish brown fumes when the stopper is removed from the bottle. It is reddish yellow from the hyponitric acid. Great care should be exercised in handling fuming nitric acid, especially in removing the stopper from a full bottle, when the confined gas may suddenly expand and throw a portion of the liquid out. This acid has a specific gravity of 1.52 (G. P.), or 49.5° Baumé.

Nitrous Acid is of the same composition as fuming nitric acid but weaker. Sold in one-pound glass-stoppered bottles.

Medicinal Uses.—The general effects of nitric acid are like those of other mineral acids, which were described under Hydrochloric Acid. It is used for the same purposes as that acid, but is perhaps to be preferred in diseases accompanied by inactivity of the liver. Only the diluted acid is given internally.

Externally, nitric acid is often used as an escharotic for the destruction of *phagedenic chancre* or *chancroids*. It stains the skin yellow. It is applied with a soft stick, and its action may be limited to a certain extent of surface by applying a piece of surgeon's adhesive plaster which has a hole exposing the desired surface, and any superfluous acid may be neutralized with an alkaline wash.

Nitric acid is also used to destroy *piles* or small *nævi* (*mother's-marks*), but it must be used with care for the latter purpose, as we remember to have seen a case in which its application to the face of a young lady for the latter purpose was followed by frightful cicatrices.

The poisonous effects are like those of hydrochloric acid ; those of a corrosive poison. The nature of the acid, when swallowed, will be betrayed by the yellow discoloration of the lips. Antidotes and treatment are like those for poisoning with hydrochloric acid.

ACIDUM NITRICUM DILUTUM; U. S.

Diluted Nitric Acid.

Mix thirty grams (or 1 ounce) nitric acid with one hundred and eighty grams (or 6 ounces) distilled water.

Description and Tests.—See the Pharmacopœia, pages 17 and 18. It is a chemically pure nitric acid, containing ten per cent. of absolute acid and having the specific gravity 1.059.

The diluted nitric acid of the Pharmacopœia of 1870 had the specific

gravity 1.101, and contained fifteen per cent. of absolute nitric acid, being thus fifty per cent. stronger than the present preparation.

Dose.—2 to 20 drops, well diluted with water, several times daily, taken through a straw or a glass tube, the mouth being afterward well rinsed to protect the teeth from injury.

For medicinal effects, see "Nitric Acid" above.

Acidum Nitrohydrochloricum; U. S.

NITROHYDROCHLORIC ACID.

Acidum Nitromuriaticum; Nitromuriatic Acid.

This is prepared by mixing forty grams (1 ounce 180 grains) of the official nitric acid with one hundred and fifty grams (5 ounces 127 grains) of the official hydrochloric acid.

Description and Tests.—See the Pharmacopœia, page 18. It is not a mere mechanical mixture. A chemical reaction with considerable rise of temperature takes place, which may cause quite violent effervescence. Hence the precaution to mix the acids in an "open" and "capacious" vessel; to put the mixture in bottles only after "effervescence has ceased," and to pour the bottles half full only, to allow ample space for the gases which are formed. These gases are chlorine and chloro-nitrous acid. The properties of the nitrohydrochloric acid depend chiefly upon the free chlorine in it.

The proportions between the nitric and the hydrochloric acid in the new formula are such as will yield the greatest amount of chlorine.

The preparation must be kept in bottles with well-fitting glass stoppers, and in a cool, dark place.

Formerly a mixture of nitric acid with hydrochloric acid was called AQUA REGIA, owing to its royal power of absorbing gold, which no other acid attacks.

Medicinal Uses.—The general effects of nitrohydrochloric acid are like those of other mineral acids as described under hydrochloric acid. It is, however, preferred to other mineral acids in diseases involving the functions of the liver.

It is useful in *chronic hepatic troubles*, and in *dysentery* and *dropsy* of hepatic origin; also in *jaundice* accompanying *malarial diseases.*

The internal use should be accompanied by the use of the nitrohydrochloric acid bath applied to the right hypochondriac region or to the whole surface of the body.

It is also given internally in syphilitic cachexia and in some cutaneous diseases. Its use must be continued for some time.

The *poisonous effects* and *antidotes* and *treatment* are like those of its component acids.

ACIDUM NITROHYDROCHLORICUM DILUTUM; U. S.

DILUTED NITROHYDROCHLORIC ACID.

Acidum Nitromuriaticum Dilutum; Diluted Nitromuriatic Acid, Phar., 1870.

Mix forty grams (1 ounce 180 grains) nitric acid with one hundred and fifty grams (5 ounces 127 grains) hydrochloric acid in the same manner as in making nitrohydrochloric acid (see above). After the reaction has subsided add seven hundred and sixty grams (26 ounces 350 grains) distilled water.

The chemical reaction by which the chlorine and chloro-nitrous acid are formed can take place only when the acids are strong, and will be entirely prevented by using previously diluted acids. After long keeping this preparation contains hyponitric and hydrochloric acids.

Description and Tests.—See the Pharmacopœia, page 18.

Dose.—0.3 to 1.50 cubic centimeter (5 to 25 minims) several times a day, largely diluted, and taken through a straw or a glass tube to prevent injury to the teeth.

Nitrohydrochloric Acid Bath.—Bartholow gives the following directions for this bath: Three ounces of nitrohydrochloric acid to a gallon of water. The feet to be placed in the bath, and the legs, arms, and abdomen to be alternately sponged. The temperature of the bath should be about 35.5° C. (96° F.).

Squire gives the proportions of eight ounces by measure to one gallon of pure water; temperature, 35.5° to 36.5° C. (96° to 98° F.). Let a flannel roller of ten or twelve inches wide, and sufficient to encircle the body twice, be soaked in this fluid and then wrung so as to remain only damp. Apply this immediately to the body, covering it with a piece of oiled silk to avoid dampening the dress. It should be worn constantly, but should be renewed morning and evening. This bath should be prepared in glass or glazed earthenware vessels.

Acidum Oleicum; U. S.

OLEIC ACID.

Description and Tests.—See the Pharmacopœia, pages 18 and 19. It should be, at most, pale yellowish in color, and nearly odorless,

and have the specific gravity mentioned, viz., 0.80 to 0.81. True plasters and soaps are *oleates*, or salts of oleic acid.

Oleic acid is introduced in the Pharmacopœia for use in the preparation of the new class of official preparations called "oleata," which are solutions of oleates in an excess of oleic acid. Oleates made without an excess of oleic acid, and dissolved in fat or petroleum ointment, are much to be preferred whenever it is possible to make them. Oleate of mercury can readily be made without any excess of oleic acid, and then remains always free from the rancid acridity which is almost sure to come in oleic acid after long keeping. (See Hydrargyri Oleatum.) Brown or rancid oleic acid is unfit for pharmacopœial uses, and may, in fact, do great harm on account of its acridity if employed in the preparation of oleates.

Acidum Oxalicum.

Oxalic Acid.

Oxalsäure, Kleesäure, G.; *Acide oxalique, Acide carboneux*, F.; *Acido Oxalico*, Sp.; *Oxalsyra*, Sw.

Obtained by the action of nitric acid on sugar or starch. It is in perfectly white, odorless crystals, soluble in eight parts cold water, and in less than its own weight of boiling water. Soluble in two and one-half parts cold, and in 1.8 part boiling alcohol. It has a very acid taste.

Is not used in medicine, but is mentioned here on account of its being sold in every drug store, and because it is used as a reagent, being employed to determine the strength of alkalies and alkaline carbonates, and for the detection of calcium salts. It is also used to remove rust and ink-spots from white fabrics.

A solution of freshly precipated ferrocyanide of iron in oxalic acid and water makes a good blue ink.

Poisonous Action.—In large doses it is an irritant poison, producing burning pain, vomiting, drowsiness or stupor with collapse and death. Powdered chalk or whitewash from the walls mixed with water should be given as an antidote, and the inflammation combated on general principles.

Acidum Phosphoricum; U. S.

Phosphoric Acid.

Phosphorsäure, G.; *Acide Phosphorique*, F.; *Acido Fosforico*, Sp.; *Fosforsyra*, Sw.

The new Pharmacopœia prescribes a phosphoric acid of 1.347 specific gravity, corresponding to 37.2° Baumé, containing fifty per cent. ortho-

phosphoric acid. As it is improbable that pharmacists will generally prepare their own phosphoric acid, we will omit here the process of preparation.

For *working formula, description, and tests*, see the Pharmacopœia, pages 19 and 20. The official tests are such as require a perfectly pure phosphoric acid. The one prepared from phosphorus by oxidation with nitric acid is the only kind which the Pharmacopœia intends should be used; and it must be quite colorless and absolutely free from arsenic, phosphorous acid, and nitric acid. It must be kept in glass-stoppered bottles.

ACIDUM PHOSPHORICUM DILUTUM; U. S.

Diluted Phosphoric Acid.

Prepared by mixing thirty grams (or 1 ounce) phosphoric acid with one hundred and twenty grams (or 4 ounces) of distilled water—all by weight.

This preparation contains ten per cent. orthophosphoric acid, and is a trifle stronger than the diluted phosphoric acid of the Pharmacopœia of 1870. The specific gravity of the new diluted phosphoric acid is 1.057, while the specific gravity of the former preparation was 1.056.

Diluted phosphoric acid must not be made from glacial phosphoric acid, as permitted in the old Pharmacopœia, as the glacial acid is generally impure.

Description and Tests.—See the Pharmacopœia, page 20.

Medicinal Uses.—Diluted phosphoric acid is employed for the same purposes as the other mineral acids, such as hydrochloric or nitric acids. It may be given for the same purposes as the hydrochloric acid, although in most cases where either would be appropriate, the latter may be preferred. It is used in heartburn, dyspepsia, indigestion, affections of the bones, nightsweats, hectic fevers, etc. It possesses the property of assuaging thirst in a marked degree, and has been given to moderate the excessive secretion of urine in diabetes by reducing the quantity of water imbibed.

Dose.—0.5 to 1 cubic centimeter (8 to 15 minims) largely diluted with water.

Phosphoric Acid Lemonade is made by mixing twelve grams (185 grains) diluted phosphoric acid (measuring about 3 fluidrachms) with ninety cubic centimeters (3 fluidounces) simple syrup, and enough water to make the whole measure one thousand cubic centimeters (34 fluidounces).

ACIDUM PHOSPHORICUM GLACIALE.

GLACIAL PHOSPHORIC ACID.

This is meta-phosphoric acid. It has the appearance of ice or broken glass. Usually it contains a considerable quantity of sodium phosphate.

Syrupy Phosphoric Acid from phosphorus is also sold by manufacturing chemists. It is generally pure. Since the introduction into the new Pharmacopœia of a phosphoric acid of fifty per cent. strength, it is probable that the syrupy phosphoric acid will be largely displaced by the official preparation.

Acidum Picricum.

PICRIC ACID.

Acidum carbazoticum—Pikrinsäure, Trinitrocarbolsäure, Welter'sches Bitter, G.; *Acide picrique, Acide carbazotique, Acide nitroxanthique, Jaune-amèr*, F.; *Acido picrico*, Sp.; *Pikrinsyra*, Sw.; *Carbazotic Acid, Trinitrophenol.*

This is tri-nitro-carbolic acid [$C_6H_3(NO_2)_3O$], formed when carbolic acid is slowly dropped into fuming nitric acid, and the mixture afterward heated.

Bright yellow crystals of an acid and excessively bitter taste, soluble in eighty-six parts of water, and very readily in alcohol and ether. It is used as a dyestuff. Stains the skin persistently and intensely yellow. Most picrates (or carbazotates) are explosive by percussion or heat. In large doses it is poisonous.

Picrate of Ammonium (carbazotate of ammonia) has been used as a remedy in ague and in trichinosis.

Dose.—From one to ten centigrams ($\frac{1}{6}$ to $1\frac{1}{2}$ grain).

Acidum Pyrogallicum.

PYROGALLIC ACID.

Light, flaky, white crystals of a somewhat pearly lustre. They blacken on exposure to light. Soluble in water, of which sixty cubic centimeters (2 fluidounces) will dissolve thirty grams (1 ounce 25 grains), the resulting solution measuring seventy-five cubic centimeters (about $2\frac{1}{2}$ fluidounces).

Uses.—It is much used by photographers. A solution of one part

pyrogallic acid in sixteen parts water is used with a solution of one part nitrate of silver in thirty parts of water as a black hair-dye.

Medicinally, it is employed in psoriasis in the form of an ointment, made of one gram (15 grains) of the acid to thirty grams (1 ounce) benzoinated lard, or petroleum ointment.

Acidum Pyrolignosum.

PYROLIGNEOUS ACID.

Acetum Pyroxylicum—Holzessig, G. ; *Acide pyroxylique*, F. ; *Trä-ättika*, Sw. ; *Wood-vinegar.*

Crude pyroligneous acid is a brown liquid of 1.015 to 1.030 specific gravity, having an acid and smoky odor and taste, and containing acetic acid, methyl-alcohol, besides a great number of other products of the destructive distillation of wood, by which the pyroligneous acid is obtained.

Rectified pyroligneous acid is less dark colored, and pure acetic acid is now largely manufactured from *wood-vinegar* or pyroligneous acid.

For medicinal purposes the acid should be one, twenty parts of which will neutralize one part dried sodium carbonate, and which will leave, on evaporation, about six to ten per cent. tar.

Medicinal Uses.—For the purification of gangrenous, and other ill-natured sores, pyroligneous acid is sometimes applied.

Acidum Salicylicum; U. S.

SALICYLIC ACID.

Salicylsäure, G. ; *Acid Salicylique*, F. ; *Acido salicylico*, Sp. ; *Salicylsyra*, Sw.; *Ortho-oxybenzoic Acid.*

Description and Tests.—See the Pharmacopœia, page 21. The official description rejects the common amorphous, and frequently pinkish-colored salicylic acid, which is impure. It requires a perfectly pure acid, in "fine, white, prismatic, needle-shaped crystals," which are well developed, present a very handsome appearance, and always furnish a good indication of purity.

Besides the solubilities stated in the Pharmacopœia we have to add that it dissolves in sixty parts glycerin, and in two parts olive oil. The solution of one part salicylic acid in two parts olive oil is effected by heat, and although a partial separation takes place on standing, the mixture becomes homogeneous again when shaken.

Salicylic acid dissolves more readily in solutions of acetate of potassium, acetate of ammonium, citrate of potassium, phosphate of ammonium., etc.

A solution of twenty grains salicylic acid to each fluidounce is the most commonly employed strength. To prepare it, triturate the salicylic acid with an equal weight of acetate of potassium, and use equal parts of glycerin and water as a solvent.

The inhalation of the dust of salicylic acid causes coughing and sneezing.

Crystallized salicylic acid is pure and odorless ; precipitated acid has a peculiar taste, more disagreeable than that properly belonging to the acid itself ; and the sublimed acid is often pink-colored and smells of phenol. The dialyzed salicylic acid is the best.

Medicinal Uses.—Salicylic acid is an antiseptic and anti-fermentative. Added to beer, cider, or milk, it prevents souring. Eggs laid in a concentrated solution may be kept fresh for a long time. It prevents putrefaction of urine, or arrests this process after it has commenced. These properties make it valuable as an application to wounds, promoting primary union and preventing suppuration and infection. When given internally in fevers it reduces the temperature, and it has been given with good results in typhoid fever, erysipelas, pneumonia, phthisis ; also as an antipyretic and antiperiodic in intermittent fevers. It is especially valuable in septicæmic fevers depending on blood-poisoning, as in diphtheria, pyæmia, traumatic fevers, etc. ; but its most important results seem to be achieved in acute rheumatism, attacks of this disease often yielding in as many days as they otherwise would last weeks.

It is also much used as a local disinfectant and deodorizing application in fetid perspiration (for example, of the feet or axilla), or as an ingredient of dentifrices in foul breath from carious teeth. It is equal to carbolic acid in the treatment of wounds ; but, unlike the latter, it does not produce poisoning. It may be applied in powder to cancerous or gangrenous wounds, or as a dressing by soaking cotton in an alcoholic solution and then drying. For external application a solution may be made by adding eight parts of borate of sodium to one hundred parts of boiling water, and when dissolved gradually adding ten parts of salicylic acid, filtering on cooling, if necessary.

Salicylic acid is extremely irritating to the mucous surfaces, and should therefore never be given in pill form or even in powder, which may remain for some time in direct contact with the membrane. It is better to give it in solution. On account, however, of the exceedingly disagreeable taste of the preparation, which makes it impossible for some

patients to take it in that form, it will be found best to prescribe salicylic acid suspended in some pleasant-tasting syrup.

Dose.—For internal use, from ten grains to one drachm. It is claimed that small doses frequently repeated are more successful in their action than large doses at longer intervals. It does not appear to be poisonous, though large doses may cause vomiting.

For *inhalation*, a solution of fifteen grams (½ ounce) of salicylic acid, fifteen grams (½ ounce) borax, and five hundred cubic centimeters (17 fluidounces) boiling water is used.

SALICYLIC ACID MIXTURE.

Dissolve five grams (75 grains) salicylic acid, and ten grams (150 grains) potassium acetate in fifteen grams (300 grains) glycerin and enough distilled water to make the whole measure one hundred cubic centimeters (3⅓ fluidounces). Contains twenty-five centigrams salicylic acid in each five cubic centimeters, or four grains to the teaspoonful.

SALICYLATUM OLEUM.

SALICYLATED OIL.

Dissolve fifteen grams (½ ounce) salicylic acid in thirty grams (1 ounce) olive oil by the aid of heat.

To be shaken before each application.

ACIDI SALICYLICI UNGUENTUM.

SALICYLIC ACID OINTMENT.

Mix thirty grams (1 ounce) salicylic acid with two hundred and seventy grams (9 ounces) petroleum butter in a porcelain evaporating dish, and heat gently until dissolved.

Acidum Succinicum.

SUCCINIC ACID.

Sal Succini—Bernsteinsäure, G.; *Acide succinique*, F.; *Acido sucinico, Sal volátil de sucino*, Sp.; *Bernstenssyra*, Sw.; *Acid of Amber.*

Occurs in amber, from which it is obtained by dry distillation. Pure succinic acid is perfectly white and odorless. This, however, is not the kind used in medicine. The medicinal succinic acid is in yellowish crystals, which should smell and taste of oil of amber. The small percentage of volatile oil in the acid is deemed to be the only active portion.

It is soluble in about twenty-four parts of cold water, and in two and one-half parts boiling water. Readily soluble in alcohol, but insoluble in ether.

Uses.—In making solution of succinate of ammonium. Succinic acid itself is probably of little, if any, value.

Dose.—0.30 to 1 gram (5 to 15 grains).

Acidum Sulphuricum; U. S.

SULPHURIC ACID.

Schwefelsäure, Vitriolöl, G.; *Acide sulphurique, Huile de vitriol,* F.; *Acido sulfurico,* Sp.; *Svafvelsyra, Vitriololja,* Sw.; *Oil of Vitriol.*

Descripton and Tests.—See the Pharmacopœia, page 21.

The official preparation is a chemically pure acid of 1.840 specific gravity, or 66.3° Baumé, containing not less than ninety-six per cent. absolute sulphuric acid (hydrogen sulphate), or eighty per cent. anhydride. Must be colorless, and to keep it so, as well as to keep it from absorbing moisture, and thus become weaker, it must be kept in bottles with well-ground glass stoppers.

Commercial sulphuric acid, commonly called *oil of vitriol,* is an impure acid containing arsenic, lead, nitric acid, etc. The lead sulphate precipitates if the acid is diluted with more than three times its weight of water and allowed to stand for a day.

The oil of vitriol sold by the manufacturers usually has a specific gravity of 1.835, corresponding to 66° Baumé, and contains about ninety-four per cent. of absolute sulphuric acid. It is put up in nine-pound bottles, and in carboys of about one hundred and seventy pounds each.

Medical Uses.—The concentrated acid is sometimes used externally to destroy morbid growths or fungoid granulations, chancroids, etc. It is a powerful escharotic, abstracting water or its equivalents of oxygenated hydrogen from organic substances and charring them. To control and confine its action it is best applied in the form of a paste made by saturating asbestos or powdered charcoal with the acid.

Poisonous Effects and Antidotes.—When taken internally its nature may be known from the blackened appearance of the lips and other parts of the mouth. It corrodes all the parts with which it comes into contact, producing intense pain with efforts to vomit. Collapse and death often occur rapidly as the consequence of the intense congestion accompanying the destruction of the lining membrane of the

œsophagus and stomach, and even if death does not ensue rapidly, it is generally brought about later by the subsequent strictures of the œsophagus.

The antidotes are as in hydrochloric acid, with the exception that water cannot be given in large quantities, as it produces intense heat with the sulphuric acid. Chalk, magnesia, soap, alkalies, and their carbonates, oil, white of egg, etc., are all appropriate. If recourse be had to the stomach-pump it is to be used with care, as shreds of the lining membrane of the stomach are apt to be sucked into the mouth of the tube and then torn off. After-treatment consists of demulcents, opiates, etc., with liquid diet.

Strong sulphuric acid has frequently been applied externally for criminal purposes, especially in France, to destroy the beauty of a successful rival or to avenge the wrongs, or supposed wrongs, inflicted by a lover. This practice has most frequently been indulged in by jealous or revengeful women, called "*vitreulleuses.*" The pouring of this acid over the face, neck, and bosom produces intense pain and destruction of tissue. The eyes may be destroyed, and when healed the entire face may be horribly disfigured by the contraction of the cicatrices. All of the acid must therefore be washed off the face and other parts with plenty of water, as soon as possible, to be followed by oil and emollients. To relieve the pain, opium may be given internally.

ACIDUM SULPHURICUM FUMANS.

Nordhausen Acid.

Fuming sulphuric acid, or Nordhausen sulphuric acid, is made by heating sulphate of iron. This is really the original "oil of vitriol," being the oily liquid obtained from *vitriol* or copperas. Now it is made by first oxidizing the copperas in the air and then heating it in retorts. It has 1.86 to 1.87 specific gravity, and is a mixture of hydrogen sulphate (sulphuric acid) and sulphuric anhydride. It is generally more or less dark colored by charred dust, etc.

ACIDI SULPHURICI LIQUOR HALLERI.

Acidus Liquor Halleri (Haller's Acid Drops) is a mixture of equal parts by weight of sulphuric acid and alcohol. The acid should be gradually added to the alcohol with constant stirring, taking care that the temperature does not rise too high, when the liquid will boil violently, vaporizing the alcohol. The mixture contains ether, alcohol, sulphuric acid, and sulph-ethylic acid.

If the alcohol contain fusel oil the preparation is liable to be yellowish ; otherwise it is colorless, or very nearly so. It has a specific gravity of 1.20. Its medicinal uses are about the same as those of aromatic sulphuric acid. Must be kept in glass-stoppered bottles.

ACIDI SULPHURICI PASTA.

Sulphuric Acid Paste is sulphuric acid mixed with sufficient powdered charcoal to form a stiff paste. It must be kept in a glass or porcelain jar with cover of the same material. It is used to cauterize syphilitic ulcers, etc.

ACIDUM SULPHURICUM AROMATICUM; U. S.

AROMATIC SULPHURIC ACID.

Mixtura Aromatica Acida, Tinctura Aromatica Acida—Elixir of Vitriol.

Put seven hundred grams (24 ounces 300 grains) of alcohol (measuring 29¼ fluidounces) in a half gallon, wide-mouthed bottle. Stir it around briskly with a glass rod so as to set it in rapid rotatory motion. Pour into it gradually, and in a small stream, two hundred grams (7 ounces 24 grains) sulphuric acid. Allow the mixture, which will become very hot from the chemical action, to get cool again. Then add forty-five grams (1 ounce 257 grains) tincture of ginger (measuring 1⅞ fluidounce), one gram (15 grains) oil of cinnamon, and enough alcohol to make the whole weigh one thousand grams (35 ounces 120 grains).

Description and Tests.—See the Pharmacopœia, page 22. It must be preserved in glass-stoppered bottles.

Ethyl-sulphuric acid is formed by the action of the sulphuric acid on the alcohol, and is a constituent of the preparation.

The above preparation (U. S. P., 1880), is an improvement upon that of the old Pharmacopœia (1870). In the old preparation a compound tincture of ginger and cinnamon was mixed with the sulphuric acid and alcohol. Thus a larger quantity of organic matter was introduced into the preparation, which, constantly acted on by the sulphuric acid, caused a continuous formation of precipitate. In the new formula the substitution of oil of cinnamon for the crude drug lessens the amount of precipitate considerably, though it does not entirely prevent it. The present preparation is lighter colored than the old. Both are reddish brown.

The new official aromatic sulphuric acid contains twenty per cent.,

by weight, of the official sulphuric acid, whereas the preparation of the Pharmacopœia of 1870 contained only nineteen per cent.

The name "Acidum Sulphuricum Aromaticum" is an awkward one, as the preparation is not an *acid*, still less an *aromatic acid*. It should have been called tinctura aromatica acida, or, still better, mixtura aromatica acida.

Medicinal Uses.—It is useful in the same diseases in which sulphuric acid is indicated, and is preferred on account of its more pleasant taste. It is frequently employed in night-sweats, especially of phthisical or hectic patients, in excessive menstrual discharge, or *menorrhagia*. If given for any length of time it is apt to derange the digestion.

The preparation is prescribed alone, to be taken in water. It is also much used in combination with sulphate of quinine, both in solution and in pills, aiding considerably the efficacy of the quinine by rendering it easily soluble.

Dose.—0.5 to one cubic centimeter (10 to 20 minims).

ACIDUM SULPHURICUM DILUTUM; U. S.

Diluted Sulphuric Acid.

Prepared by mixing thirty grams (or 1 ounce), by weight, of sulphuric acid with two hundred and seventy grams (or 9 ounces) of distilled water. In making it be careful to put the water in a vessel capable of holding at least one-third more than the total volume of the two liquids; then set the water in rapid rotatory motion by stirring it around vigorously in one direction with a glass rod, after which pour the sulphuric acid gradually, and in a small stream, into the center of the moving water. There will then be no danger of a sudden boiling over of the mixture, which sometimes takes place when sulphuric acid and water are mixed. To add the water to the sulphuric acid instead of the contrary, would almost certainly cause such a violent commotion as to throw the liquid out, and perhaps cause serious injury to the operator.

Description and Tests.—See Pharmacopœia, page 22. Contains ten per cent. of the official sulphuric acid, and has a specific gravity of 1.069. Must be perfectly clear and colorless, and kept in glass-stoppered bottles. The diluted acid of the Pharmacopœia of 1870 had a specific gravity of 1.094, and contained 11.14 per cent. of sulphuric anhydride, SO_3, or 12.38 per cent. absolute sulphuric acid, H_2SO_4. The acid of 1880 is therefore less than five-sixths as strong as that of 1870.

Medicinal Uses.—Sulphuric acid is generally given internally in the form of diluted sulphuric acid, or as aromatic sulphuric acid. The

effects are described under the latter heading. Sulphuric acid possesses the general properties of mineral acids, but is more astringent.

Dose of the diluted acid.—Ten to thirty drops, largely diluted, and taken through a straw or glass tube to prevent injury to the teeth.

ACIDI SULPHURICI LEMONADUM.

Sulphuric Acid Lemonade is made by mixing two grams (31 grains) sulphuric acid with about five hundred cubic centimeters of water, and then adding ninety cubic centimeters (3 fluidounces) simple syrup and enough water to make the whole about one thousand cubic centimeters (or 34 fluidounces).

It is much used as a prophylactic against cholera.

ACIDI SULPHURICI SYRUPUS.

Sulphuric Acid Syrup.

Mix thirty cubic centimeters (1 fluidounce) diluted sulphuric acid and two hundred and seventy cubic centimeters (9 fluidounces) simple syrup.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

Acidum Sulphurosum; U. S.

Sulphurous Acid.

Schweflige Säure, G.; *Acide sulfureux*, F.; *Swafvelsyrlighet*, Sw.

Description and Tests.—See the Pharmacopœia, pages 22 and 23. It is improbable that any great number of pharmacists will prepare sulphurous acid, and hence we omit the process of preparation.

The preparation is a solution of sulphurous acid gas in water. It contains three and one-half per cent. of the acid, and has the specific gravity 1.022. Smells like the fumes of burning sulphur. Should be clear and colorless.

Preservation.—It must be kept in small and quite filled, dark, amber-colored bottles, with well ground glass stoppers, and in a cool place.

Sulphurous acid is an energetic deoxidizing agent, and hence bleaches vegetable colors.

Medicinal Uses.—Internally it has been given in zymotic diseases, but the sulphites are generally preferred. The sulphurous acid is especially useful in the vomiting of frothy or yeasty matters containing *sarcinæ ventriculi*. Externally it is used as a disinfectant and deodorizer. It is useful as an application in parasitic skin diseases.

The fumes of burning sulphur (sulphurous acid gas) are an excellent disinfectant for rooms or hospital wards. The patients having been removed, a dish of sulphur is placed in the room and ignited. The doors and windows are tightly closed and the room left for some time so that the fumes may penetrate into all parts of the apartment. It must be recollected that this procedure will bleach and destroy textile fabrics, as curtains, carpets, etc., if left in the room.

Dose of the acid for internal use.—One to two fluidrachms (4 to 8 cubic centimeters) largely diluted with water.

Acidum Tannicum; U. S.

TANNIC ACID.

Acidum Gallo-Tannicum, Tanninum—Gerbsäure, Tannin, G.; *Acide tannique, Tannin,* F.; *Acido Tanico, Tanino,* Sp.; *Galläpplegarfsyra, Tannin,* Sw.—*Tannin.*

Description and Tests.—See the Pharmacopœia, page 23. It consists of pale yellowish and very light porous masses, or coarse powder made up of small shining scales. It often has a greenish tint.

Tannic acids of various kinds exist in numerous plants, as in the astringent drugs; thus there is quercitannic acid in oak bark, cinchotannic acid in cinchona, catechutannic acid in catechu, etc. The official tannic acid is gallotannic acid—the one extracted from nut-galls.

Turkish galls contain sometimes as much as sixty-five per cent., and Chinese galls even more. The tannic acid from Chinese galls has a lighter color.

Heat aids the solution of tannin in its solvents. The solutions darken by age and exposure to air, and even dry tannic acid darkens in the light of the sun.

It takes a ten-ounce bottle to hold one ounce tannin without crushing or shaking it down. It is sold in one-ounce bottles and one-pound boxes. An ordinary flour barrel holds about twenty-five pounds.

Medicinal Uses.—This substance is a powerful astringent and is useful in all relaxed conditions of the tissues, especially of the mucous membranes. It is indicated for internal use in diarrhœas, fluxes, and hemorrhages. In hemorrhage from the kidney it is especially useful. It is also used in the form of a spray (in solution) in hemorrhage from the lungs. All hemorrhages, especially if of a passive nature, will be diminished or arrested by this substance.

Tannic acid coagulates the fibrin when added to the blood, forming clots, and is therefore an excellent local styptic, and may be applied in

the form of powder to the bleeding surfaces, as in bleeding from the nose, vagina, rectum, leechbites, etc. It is also good in spongy and bleeding gums as a wash; in leucorrhœa, gleet, and gonorrhœa after the first acute painful stage is passed, as an injection; in pharyngitis as a gargle, and in profuse sweating as a wash.

When bedsores threaten to form, the skin may be washed over the prominences with a solution of tannic acid, alcohol, and water.

In the eczema, especially of children, we have used it frequently and found it to act well. In the moist condition of this disease a dusting powder consisting of tannic acid, with or without lycopodium, may be applied with a puff. If dry crusts have formed, we loosen and remove the crusts with tepid soap-water and apply an ointment of tannic acid, five grams, with oxide of zinc ointment, forty grams, on lint.

In *prolapsus ani* the protruded part of the gut may be dusted over with tannic acid in fine powder, and the bowel then returned.

The **dose** for internal use is from 0.20 to 0.50 gram (3 to 8 grains), in pill, wafer, or capsule. It is very difficult to swallow it in solution.

COLLODIUM STYPTICUM; U. S.

Styptic Collodion.

Dissolve twenty grams (309 grains) tannic acid in a mixture of five grams (77 grains, measuring 100 minims) alcohol, twenty grams (309 grains, measuring about 7 fluidrachms) ether, and fifty-five grams (1 ounce 411 grains) collodion, by agitating these ingredients together in a bottle. When solution is completed, keep the product in well-closed bottles in a cool place away from fire or flames. The bottles should not be more than three-fourths filled.

This preparation is new to the Pharmacopœia.

Uses.—It combines the styptic properties of tannin with the protective ones of the collodion. Used in superficial hemorrhage of capillary origin or from small wounds. The reduction of the size of the small vessels by the contraction of the collodion materially assists in controlling the hemorrhage.

COLLODIUM HÆMOSTATICUM (PAVESI).

Pavesi's Hæmostatic Collodion.

Dissolve five grams benzoic acid and five grams tannic acid in one hundred grams collodion ; then add ten grams crystallized carbolic acid, and shake well.

Uses.—The same as those of styptic collodion. The antiseptic properties of carbolic are here added.

ACIDI TANNICI GLYCERITUM.

GLYCERITE OF TANNIN.

Glycerole of Tannin.

Triturate fifty grams (1 ounce 334 grains) tannin in a Wedgewood mortar with two hundred and fifty grams (or $6\frac{3}{4}$ fluidounces) glycerin until thoroughly mixed. Then put the mixture into a porcelain evaporating dish and heat it until solution is effected.

The preparation is not clear, more or less scum rising to the surface, which must be skimmed off. It has a brownish color.

Used externally as an astringent local application; rarely internally, in doses of from one to four grams (15 to 60 grains).

Acidi Tannici Injectio is made from one gram (15 grains) tannic acid to one hundred cubic centimeters ($3\frac{1}{3}$ fluidounces) rose-water.

This is used both for injections and with the spray apparatus.

ACIDI TANNICI LINIMENTUM.

LINIMENT OF TANNIN.

Dissolve ten grams (154 grains) tannic acid in sixty grams (2 ounces) olive oil.

Used as an application to burns.

ACIDI TANNICI PILULÆ.

TANNIC ACID PILLS.

One gram (15 grains) of glycerin makes a proper pill mass, with four grams (60 grains) tannic acid. This mass is most conveniently divided into forty pills, each pill thus containing 0.10 gram ($1\frac{1}{2}$ grain).

ACIDI TANNICI SUPPOSITORIA.

TANNIC ACID SUPPOSITORIES.

Incorporate four grams (or 60 grains) tannic acid with twenty grams (or 300 grains) cacao butter, and divide the mixture into twelve suppositories.

They are best made on a moist board, with an elastic, well nickel-plated spatula. An iron spatula (not plated) should not be used, as this metal will blacken the mass.

A *vaginal plug* for stopping hemorrhage may be made from four

grams (60 grains) tannic acid and 0.50 gram (7 minims) glycerin. It is held in place by a piece of sponge.

Schuster's Pastiles are urethral suppositories made of two grams (30 grains tannic acid, 0.06 gram (1 grain) opium, and a sufficient quantity of glycerin to form a mass which is made up into cylinders.

ACIDI TANNICI TROCHISCI; U. S.

TANNIC ACID TROCHES.

Mix 6.50 grams (or 100 grains) tannic acid, sixty-five grams (1,000 grains) powdered sugar, and 1.60 gram (25 grains) powdered tragacanth, and make the mixture into a suitable mass with a sufficient quantity of orange-flower water. Divide the mass into one hundred troches.

ACIDI TANNICI UNGUENTUM; U. S.

TANNIN OINTMENT.

Mix intimately five grams (77 grains) tannic acid, and forty-five grams (1 ounce 257 grains) benzoinated lard.

Do not use an iron spatula, but a nickel-plated or a horn spatula.

ACIDI TANNICI VINUM.

TANNIN WINE.

Dissolve one gram (15 grains) tannic acid in two hundred cubic centimeters (6¾ fluidounces) of pure claret wine. Filter.

Used as an injection in gonorrhœa.

Acidum Tartaricum; U. S.

TARTARIC ACID.

Weinsäure, Weinsteinsäure, G.; *Acide tartrique, Acide de Tartre*, F.; *Acido Tartárico*, Sp.; *Vinsyra*, Sw.

Description and Tests.—See the Pharmacopœia, page 24. Tartaric acid in crystals is rarely to be found in the shops, the powdered being preferred for the sake of convenience.

The whole acid is in transparent, colorless crystals, odorless, of a pure, strongly acid taste. The crystals are not affected by the air. The powder is of a pure white color and dry. It is soluble in two-thirds its weight of water, and easily in three times its weight of ninety per cent.

alcohol. One hundred grains of tartaric acid neutralizes one hundred and thirty-three grains of bicarbonate of potassium.

When dry tartaric acid is triturated in a mortar in the dark, it emits light. At 15.5° C. (60° F.), a forty-two per cent. solution of tartaric acid has a specific gravity of 1.22 ; a forty per cent. solution, 1.207 ; a thirty per cent. solution, 1.149 ; twenty-five per cent., 1.121 ; twenty per cent., 1.095 ; fifteen per cent., 1.070 ; ten per cent., 1.045 ; and a five per cent. solution, 1.021 (Hager).

Original packages of tartaric acid in crystals are barrels containing about three hundred pounds ; the powdered tartaric acid is sold in barrels of two hundred and seventy-five pounds, and in boxes of fifty pounds each.

It is used for the same purposes as citric acid, and is often substituted for the latter on account of its being cheaper.

ACIDI TARTARICI SYRUPUS.

Syrup of Tartaric Acid.

Mix four grams (80 minims) spirit of lemon with nine hundred and eighty grams (34 ounces 250 grains, measuring about 25 fluidounces) simple syrup in a liter (or quart) bottle. Add gradually eight grams (124 grains) tartaric acid, dissolved in eight grams (2 fluidrachms) water, shaking the bottle after each addition, until all is thoroughly mixed. The final product should weigh one thousand grams (35 ounces 120 grains), and will measure about seven hundred and sixty-five cubic centimeters (25½ fluidounces).

Tartaric Acid Lemonade is made by mixing one hundred cubic centimeters (3⅓ fluidounces) of syrup of tartaric acid with nine hundred cubic centimeters (30½ fluidounces) of water.

Acidum Valerianicum.

Valerianic Acid.

Acidum Valericum—Baldriansäure, Valeriansäure, G. ; *Acide Valerianique, Acide Valerique*, F. : *Acido Valerianico, Acido Valerico*, Sp. ; *Valeriansyra*, Sw.

Preparation.—Originally made from valerian, from which it derives its name. Now made chiefly by oxidizing fusel oil with chromic acid.

Description.—A colorless oily liquid, of a penetrating, disagreeable, sour, valerian-like odor, reminding at the same time of old cheese. Tastes acrid, acid, disagreeable. Dissolves one-fifth its weight of water ;

and itself dissolves in thirty times its weight of water. Is miscible in all proportions with alcohol and ether. Its specific gravity is 0.933 to 0.935.

Used for making valerianate of ammonium and other valerianates.

Aconitum; U. S.

ACONITE.

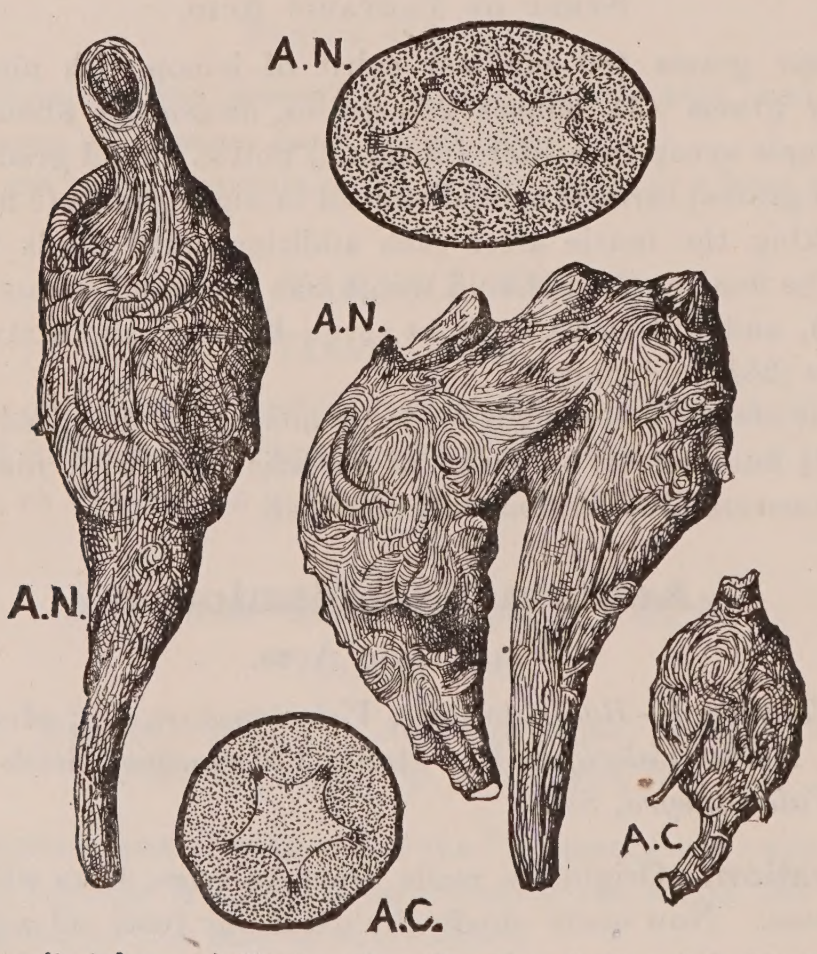
Tuber Aconiti; Aconiti Radix—Eisenhutknollen, Sturmhutknollen, G.; *Racine d'aconit,* F.; *Raiz de Aconito,* Sp.; *Stormhattrot,* Sw.

Origin.—*Aconitum Napellus,* Linné (*Ranunculaceæ*).

Habitat.—Europe, Asia, and North America.

Part Used.—The tuber, or tuberous root.

Description.—See the Pharmacopœia, page 24. The root (tuber) is now the only part of this plant that is recognized by the Pharmaco-



FIGS. 1-5.—Aconite tubers. A.N., Aconitum Napellus, single and double tubers, natural size, and transverse section slightly enlarged. A.C., same of Aconitum cammarum.

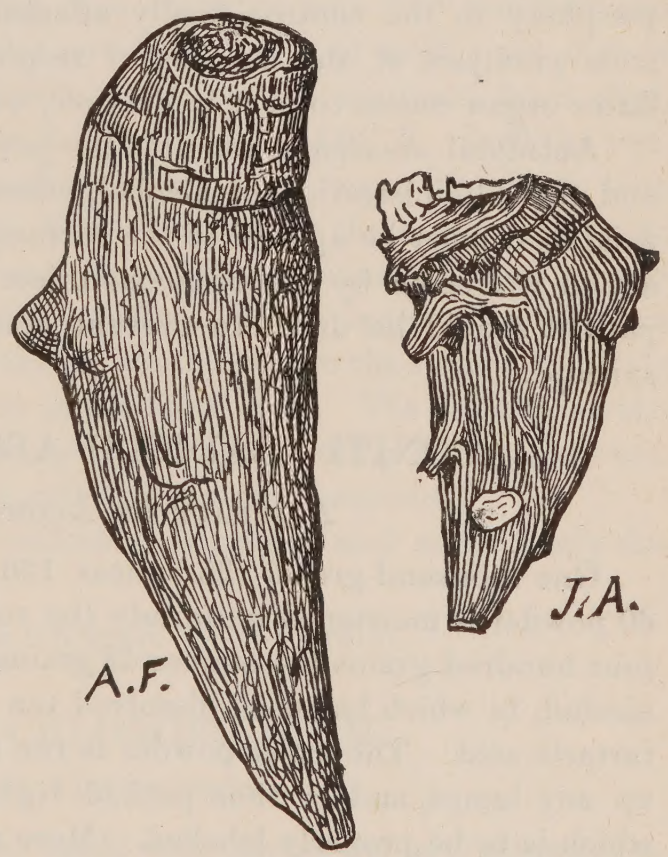
pœia, and the only species of aconite from which the root is to be collected is the Aconitum Napellus. Formerly both the leaves and the root

were separately official, and in some countries the roots and leaves of other species of aconitum besides Aconitum Napellus are used (A. cammarum, and A. variegatum). It is from twelve to sixteen millimeters ($\frac{1}{2}$ to $\frac{2}{3}$ inch) thick at the top, where frequently a small remnant of the stem is left, from twenty-five to seventy-five millimeters (1 to 3 inches) long, and tapering to a blunt point. It is usually very much wrinkled, and brownish black, externally, and often two tubers ("mother and daughter") are seen adhering together. When tasted, or when the dust is inhaled, or any of its preparations taken, it causes a burning sensation in the throat. It must be sound, not discolored externally or internally, and free from mites.

Constituents.—The chief constituents are the alkaloids *aconitine* and *pseudaconitine*, which are found in all parts of the plant, probably combined with aconitic acid.

Other Aconite Roots.—The tubers of Aconitum cammarum and Aconitum ferox are shown beside the one of Aconitum Napellus in the illustration. Japanese, or Chinese aconite root is also shown; it is obtained from a species not yet ascertained, and contains a somewhat different alkaloid from the aconitine, called *japaconitine*, which is even more poisonous than aconitine.

The Indian aconite root (bish, or bikh) from Aconitum ferox is about double the size of the official drug, and a great deal stronger and more poisonous; but it does not yield *aconitine*, containing instead only *pseudaconitine* (called also acraconitine, napelline, and nepaline).



FIGS. 6–7.—A.F., Aconitum ferox, natural size. J.A., Japanese aconite, natural size.

Medicinal Uses.—Aconite is a powerful sedative or motor depressant, reducing the force and number of heartbeats and the arterial tension. If a full medicinal dose is given, weakness of the limbs, tongue, and lips, and a sense of constriction of the fauces occur. It paralyses the sensory as well as the motor nerves, the action beginning at the peripheral ends.

This remedy is used to reduce fevers. It is especially useful in inflammatory diseases of the lungs, in tonsillitis, acute pharyngitis, over-excitement of the heart, etc. In neuralgia it may be used advantageously—externally as well as internally.

Dose.—0.03 to 0.12 gram ($\frac{1}{2}$ to 2 grains) of the powdered root. Average dose about 0.03 gram ($\frac{1}{2}$ grain).

The doses of aconite preparations, as quoted by various authorities, differ materially, and this fact, in addition to the variability of the quality of the drug itself, makes it difficult to state doses. It is safest to commence with small doses and carefully increase them until the desired effect is obtained.

Poisonous Effects.—In an overdose aconite is a powerful narcotic poison. The effects begin in a few minutes after the taking of the excessive dose, the patient complaining of excessive weakness and fatigue, to which is added stupor as the paralysis proceeds from the periphery to the centres, finally affecting the brain. The patient dies from paralysis of the muscles of respiration and of the heart, which latter organ ceases to beat in diastole, being too weak to contract.

Antidotal treatment requires the prompt evacuation of the stomach and the administration of alcohol, ether, ammonia, or digitalis. Artificial heat must be applied to the surface, and the failure of the heart's action overcome by subcutaneous injection of atropine or alcohol. The patient should lie down to prevent cessation of heart action through syncope.

ACONITI [RADICIS] ABSTRACTUM; U. S.

Abstract of Aconite [Root].

One thousand grams (35 ounces 120 grains) of aconite root in No. 60 powder is moistened uniformly (by rubbing between the hands) with four hundred grams (14 ounces 48 grains, measuring $16\frac{2}{3}$ fluidounces) of alcohol, in which has been dissolved ten grams (154 grains) powdered tartaric acid. The moist powder is run through a coarse sieve, to break up any lumps, and is then packed tightly in a cylindrical percolator, which is to be properly labelled. More alcohol is now poured on until the whole mass is entirely permeated, and liquid begins to drop from the exit tube, while a layer of the alcohol remains covering the top of the packed drug. The exit tube of the percolator is now closed tightly, and the top carefully covered to prevent evaporation. The whole is allowed to stand forty-eight hours to macerate. Then the percolator is opened below and the percolation proceeded with, adding alcohol on top, from time to time, so as to keep the drug always covered, until

eight hundred and fifty grams (30 ounces, measuring about 35 fluidounces) of percolate has been collected, which is set aside and properly labelled "reserved percolate." A new receiving bottle is placed under the percolator and the percolation continued in the same way as before, until the drug is completely exhausted. If the drug was well packed and the percolator tall enough in proportion to its diameter, the point of exhaustion will have been reached before the total percolate amounts to twice the weight of the drug, or before in all two thousand grams (a little over 70 ounces, measuring about 80 fluidounces) of percolate has been received. The second percolate—that collected after the "reserved percolate"—is now put into a weighed porcelain evaporating dish and evaporated down until it weighs one hundred and fifty grams (5 ounces 127 grains), which is mixed with the reserved percolate, the total weight of the fluid extract thus being the same as that of the drug used. If need be, the liquid is to be filtered, after which it is put into a tared evaporating dish together with two hundred and fifty grams (8 ounces 358 grains) powdered sugar of milk ; the dish is covered with a thin piece of muslin to protect the contents from dust, and is then set in a warm place, not over 50° C., 120° F., until the contents are dry. A sufficient quantity of powdered sugar of milk is then added to make the total weight of the contents of the dish five hundred grams (17 ounces 279 grains), and the whole is triturated until a very fine and perfectly uniform powder results. When large quantities are operated upon the greater portion of the alcohol in the second percolate may be recovered by distillation in the usual way. The addition of tartaric acid to the menstruum in a proportion amounting to one per cent. of the drug used facilitates the extraction of the aconitine.

This preparation is more uniform in strength and more easily dispensed than the extract.

The **Dose** is about 0.015 to 0.5 gram ($\frac{1}{4}$ to 1 grain).

ACONITI CHLOROFORMUM.

Aconite Chloroform.

A fluid extract of aconite root made with chloroform as a menstruum.

Used for neuralgia.

ACONITI EMPLASTRUM.

Aconite Plaster.

Evaporate five hundred cubic centimeters (17 fluidounces) fluid extract of aconite root to the consistence of a thick, soft extract. Incor-

porate intimately with it a sufficient quantity of melted resin plaster to make the whole product weigh five hundred grams (17⅔ ounces).

A good anodyne plaster in painful rheumatism, neuralgia, etc.

ACONITI [RADICIS] EXTRACTUM; U. S.

Extract of Aconite [Root].

(Ought to be called extract of aconite root, being several times the strength of the "Extract of Aconite" of 1870, which was made from the leaves).

The official process for its preparation is as follows: To make the extract from five hundred grams (17⅔ avoirdupois ounces) of the drug in No. 60 powder: Moisten with a solution of five grams (77 grains) tartaric acid in two hundred grams (8⅓ fluidounces) alcohol. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate. Reserve four hundred and fifty grams (about 15 fluidounces) of *first percolate*. Continue percolation until the aconite is exhausted, or until 1,050 grams (about 42 fluidounces) *second percolate* has been collected. Evaporate the *second percolate* to fifty grams (1⅔ ounce) before adding it to the *first percolate*. Evaporate the mixture to a pilular consistence. To the remainder add one-twentieth part of its weight of glycerin.

Practically the same product is obtained by evaporating the fluid extract to the pilular consistence and then incorporating the five per cent. of glycerin. It is dark brown.

Dose.—0.005 to 0.015 gram (1/12 to ¼ grain).

Caution.—Be careful in dispensing extract of aconite to determine whether the extract of the root ("Extract of Aconite," U. S. Pharmacopœia, 1880), or the extract of the leaf ("Extract of Aconite," U. S. Pharmacopœia, 1870), or the extract of the fresh leaves and flowering tops ("Extract of Aconite," B. P.), is intended, and whether the dose is a safe one, as these several extracts of aconite vary greatly in strength, while they all have the same name and are in actual use, and generally found in the shops, with the exception of the official extract of the new Pharmacopœia of the United States, which is not yet in common use.

The new extract of aconite (from the root) is at least four times the strength of the extract of aconite of the old U. S. Pharmacopœia, which is now in stock in all drug stores, and at least twice the strength of the English "Extract of Aconite," which is used a great deal in this country (Allen's).

Physicians prescribing extract of aconite ought to designate which

kind they intend, for the pharmacist must otherwise either ignore the Pharmacopœia and dispense the old discarded preparation, or the preparation of the British Pharmacopœia, or he must run a fearful risk, if the dose is a full one, and he should dispense the now official preparation. We cannot do otherwise than to advise pharmacists *not* to dispense the extract of aconite root when "Extract of Aconite" is prescribed, unless they are quite positive that the new extract is really intended.

Nomenclature.—We regret that the recommendation made to the Committee of Revision of the Pharmacopœia that the plant part used be specified throughout the pharmacopœial nomenclature was not adopted. The preparations of aconite furnish strong illustrations of the serious risks that are possible on account of this omission. Conium furnishes other illustrations.

The instances where different parts of the same plant are used, and the preparations of two or three different parts of the same plant kept side by side on the pharmacist's shelf are many, and although the cases where this fact may result in serious harm on account of a failure to give each preparation its proper full name may not be numerous, the cases where this omission may lead to disappointment are too plentiful, and even in the cases of comparatively innocent drugs the only correct nomenclature is surely that which at once distinguishes the drug or preparation from any other that may be at all used, whether official or unofficial. The answer that the Pharmacopœia should not or need not recognize the existence of drugs or preparations not included in it, is, in our opinion, wrong. Cognizance should be taken of every fact which is liable to lead to conflict or error unless due precaution be observed. Even in some cases where only one part of a certain plant is now used it is not at all improbable that some other part of the same plant may be preferred by one or by many physicians at any future time; and if the one part now used monopolizes the generic name of the plant without qualification, it is evident that there will be no certainty of avoiding confusion should two or more parts of the plant be used side by side, or a new part of the plant take the place of the old drug.

ACONITI [RADICIS] EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Aconite [Root.]

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *first menstruum* use a mixture of two hundred grams (about 8⅓ fluidounces) alcohol, and five grams (77 grains) tartaric acid.

As a *second menstruum* use alcohol. Moisten the drug with the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate. Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Dose.—0.05 to 0.12 cubic centimeters (1 to 2 minims), with care.

ACONITI LINIMENTUM.

Aconite Liniment.

Dissolve ten grams (150 grains) camphor in sixty cubic centimeters (2 fluidounces) fluid extract of aconite, and then add sufficient soap liniment to make the whole measure one hundred and twenty cubic centimetres (4 fluidounces).

In the Pharmacopœia of 1870 the preparation called "Liniment of Aconite" was simply fluid extract of aconite, which name the preparation now bears.

Fluid extract of aconite root may be a good liniment in some cases, but we have seen its application cause severe vesication. A diluted preparation like the one above suggested will probably prove sufficiently strong in most cases.

Uses.—An embrocation, exceedingly valuable in painful affections or inflammations, as rheumatism, enlarged joints, neuralgia, etc.

ACONITI [RADICIS] TINCTURA; U. S.

Tincture of Aconite [Root].

Moisten four hundred grams (14 ounces 48 grains) aconite root in No. 60 powder with two hundred grams (7 ounces 24 grains, measuring 8⅓ fluidounces) alcohol, in which has been previously dissolved four grams (62 grains) powdered tartaric acid. Macerate twenty-four hours.

Then pack it tightly in a cylindrical glass percolator, and percolate until one thousand grams (35 ounces 120 grains, measuring about 41 fluidounces) of tincture has been obtained. Tartaric acid aids the extraction of the alkaloid.

Dose.—0.10 to 0.25 cubic centimeters (1½ to 4 minims).

This tincture is (according to Dr. Squibb's *Ephemeris*, September, 1882) twenty-eight times the strength of tincture of aconite leaf. Do not dispense tincture of aconite root where tincture of aconite leaf is intended.

Dispensing clerks are usually instructed by careful pharmacists not to dispense this tincture unless the prescription specifically designates the tincture of aconite root.

ACONITI TINCTURA FLEMINGII.

FLEMING'S TINCTURE OF ACONITE.

From five hundred grams (17⅔ avoirdupois ounces) of aconite root in No. 60 powder make seven hundred and ten cubic centimeters (24 fluidounces) of tincture by percolation with alcohol.

Dose.—0.05 to 0.20 cubic centimeter (1 to 3 minims). This is nearly twice the strength of the official tincture.

Aconiti Folia.

ACONITE LEAF.

Origin, habitat, and constituents the same as in Aconitum.

Description.—Dark green leaves formed as seen in Fig. 9. A discolored or bleached drug must be rejected. As met with in the market it usually consists of the whole flowering tops.

Aconite leaf is not now official, having given place in the Pharmacopœia to the root, which is stronger and more uniform in quality *when collected from the proper plant.* The leaves are, however, still used to a very considerable extent, being found in a majority of the drug stores. It is, therefore, unfortunate that the aconite root should be simply called aconite, instead of being named in full.

Medicinal Uses.—The same as those of the root. The leaves are weaker and more variable in strength.

Dose.—From 0.06 to 0.25 gram (1 to 4 grains).

ACONITI [FOLIORUM] EXTRACTUM; B.

English Extract of Aconite.

The fresh leaves and flowering tops of aconite are bruised in a stone mortar and the juice pressed out. Heat it gradually to 130° F., and separate the green coloring matter (chlorophyll) on a muslin strainer.

Fig. 8.—Aconite, flowering top reduced; *a*, section of flower; *b*, flower with sepals removed.

Heat the strained liquid to 200° F., to coagulate albumen, and then strain again. Evaporate on a water-bath to the consistence of syrup. To this add the separated chlorophyll, and then continue the evaporation at a heat not above 140° F., stirring assiduously, until the extract has the proper consistence.

Brownish green.

Dose.—0.015 to 0.03 gram ($\frac{1}{4}$ to $\frac{1}{2}$ grain).

Caution.—This extract, which is sold in the market as "English Extract of Aconite" is not the "Extract of Aconite" of the present U. S.

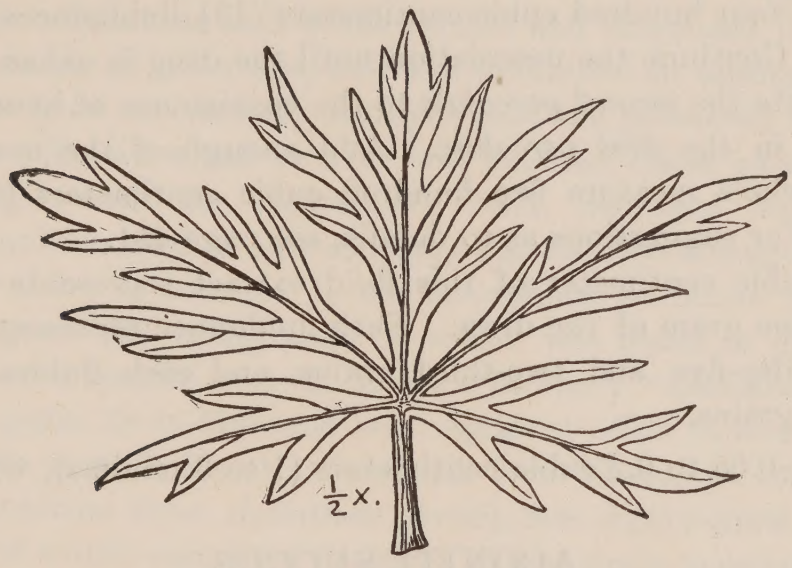


FIG. 9.—Aconite leaf, reduced.

Pharmacopœia (nor of the U. S. Pharmacopœia of 1870). The "Extract of Aconite," U. S. Pharmacopœia, 1880, is at least twice as strong as the above preparation.

ACONITI FOLIORUM EXTRACTUM ALCOHOLICUM.

ALCOHOLIC EXTRACT OF ACONITE LEAVES.

Evaporate any desired quantity of the fluid extract of aconite leaves to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brownish green. Yield about twenty-five per cent. This was the "Extract of Aconite" of 1870; it is not now official. The new "Extract of Aconite" of 1880 is at least four times as strong.

Dose.—0.02 to 0.06 gram ($\frac{1}{3}$ to 1 grain).

ACONITI FOLIORUM EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ACONITE LEAVES.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a menstruum use alcohol and water, mixed in the proportion of

two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 8 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-third grains, and each fluidrachm nearly fifty-seven grains.

Dose.—0.05 to 0.2 cubic centimeters (1 to 3 minims), with care.

ACONITI SUCCUS.

ACONITE JUICE.

Mix three hundred cubic centimeters (10 fluidounces) of juice expressed from bruised fresh aconite herb with one hundred cubic centimeters (3⅓ fluidounces) alcohol; let stand seven days, and then filter.

Dose.—About one cubic centimeter (16 minims).

ACONITI FOLIORUM TINCTURA.

TINCTURE OF ACONITE LEAF.

Make two hundred and forty cubic centimeters (8 fluidounces) tincture by percolation with diluted alcohol from 31.1 grams (480 grains) aconite leaf in No. 40 powder.

Dose.—0.5 to one cubic centimeter (8 to 15 minims).

This tincture is, according to Dr. Squibb, only one twenty-eighth ($\frac{1}{28}$th) the strength of the official tincture of aconite root, and one forty-eighth ($\frac{1}{48}$th) the strength of Fleming's tincture of aconite.

Aconitina.

ACONITINE.

This alkaloid is the most important constituent of aconite. It is in pure, white, well-developed crystals, soluble in alcohol and in dilute acids. The true aconitine can best be obtained by precipitation from

Duquesnel's crystallized nitrate of aconitine. No other aconitine ought to be used internally because no other aconitine is reliable.

A substance so powerful as aconitine must be extremely dangerous to use unless of tolerably uniform quality and strength. The pure true aconitine in white crystals cannot but be uniform. But there are several other substances sold in the market and dispensed in the shops under the name of aconitine, and the difference in strength between them ranges from one scarcely stronger than the powdered aconite root to the pure alkaloid which is over one hundred times as strong. Dr. Squibb's *Ephemeris* for September, 1882, mentions four different kinds of aconitine used in this country, the relative strength of which was found to be as follows: 1, An amorphous aconitine of unknown make, one grain (65 milligrams) of which was equal in effect to one grain powdered aconite root; 2, Merck's ordinary "aconitin," of which one-eighth grain (8 milligrams) was equal in effect to one grain powdered aconite root; 3, Merck's "aconitin from Himalaya root" (probably pseudaconitine from *Aconitum ferox*), one eighty-third grain (0.78 milligram) of which was equal in effect to one grain powdered aconite root; and 4, Duquesnel's aconitine, one one-hundred-and-eleventh grain (0.59 milligram) of which was equal in effect to one grain of the powdered aconite root.

Amorphous aconitine (not in crystals) varies from an extract-like mass to a light brown powder, is of uncertain source, and variable strength and therapeutic action. It is, therefore, dangerous and unfit to be used.

Pseudaconitine is a different alkaloid from (real) aconitine, and has different medicinal effects from those obtained from aconitine. The pseudaconitine is extracted from the Indian aconite root (A. ferox), and is the same thing as sold by Merck under the name of "aconitine from Himalaya root." It is light brown and amorphous—never pure white and in well-developed crystals, which true aconitine always is.

The "Aconitin" of the Eclectic Medicine (American) is still another preparation of altogether indefinite composition.

If a physician prescribes aconitine for internal use, basing his dose upon results obtained with some one of the other substances called by that name, but of variable character and composition, and frequently not containing any *aconitine* at all, pure or true aconitine might be dispensed and serious results ensue, as the one one-hundredth part of a grain may prove fatal.

Of true *aconitine* the one two-hundredth part of a grain is a maximum dose. The other kinds should never be used except externally.

Medicinal Uses.—Aconitine may be used internally for the same purposes as aconite, but is mainly employed for external application in the form of solution or ointment in *neuralgia.*

Dose.—Maximum, for internal use, 0.0003 gram ($\frac{1}{200}$ grain).

Externally a solution of 0.075 gram in five cubic centimeters ($1\frac{1}{4}$ grain in 75 minims) of alcohol may be applied with a brush, or an ointment, containing 0.05 to 0.20 gram in five grams (1 to 3 grains in a drachm) of simple cerate may be used.

ACONITINÆ OLEATUM.

OLEATE OF ACONITINE.

Triturate one gram (15 grains) of aconitine thoroughly with a little oleic acid in a warm mortar to a smooth paste. Then add enough oleic acid to make the whole mixture weigh one hundred grams (1,500 grains), and set the mortar in a warm place, triturating the contents occasionally until the aconitine is dissolved. Contains one per cent. aconitine.

Used externally in neuralgia, etc.

ACONITINÆ UNGUENTUM.

ACONITINE OINTMENT.

Dissolve one gram (15 grains) aconitine in six grams (2 fluidrachms) alcohol, and mix the solution intimately with enough benzoinated lard to make the whole weigh one hundred grams (3 ounces 230 grains avoirdupois).

Uses.—Externally in neuralgia, sciatica, etc.

Actæa.

ACTÆA.—BANEBERRY.

Origin.—*Actæa rubra* and *A. alba,* Bigelow (*Cimicifugeæ*).

Habitat.—The United States.

Part Used.—The rhizome with the rootlets.

Description.—Blackish gray roots resembling cimicifuga. Inodorous. Taste bitter, acrid.

Constituents and Properties.—Similar to those of cimicifuga.

Uses.—Emetic and cathartic. Has been recommended for asthma.

Dose.—One to two grams (15 to 30 grains) during the day.

Adeps; U. S.

LARD.

Axungia, Axungia Porci, Adeps Suillus—Schweineschmalz, G.; *Axonge, Graisse de porc*, F.; *Grasa de Cerdo*, Sp.; *Ister, Svinister*, Sw.

Description and Tests.—See the Pharmacopœia, pages 24 and 25. The best, freshly rendered hog's lard. Must be free from rancidity, contain no water nor salt, and have a perfectly white color when solidified. When semifluid it has a watery-white color.

Rendering lard is a rather slow process. All membranes must be carefully picked out. The fat should be cut into small pieces, and washed well with cold water to remove blood, etc., which, if allowed to remain, would cause the lard to spoil rapidly. It is then heated by steam, or on a water-bath in a porcelain or tinned copper vessel, to the boiling point; it is next strained through flannel, again heated until all moisture has been expelled, and then put into jars of glass or porcelain, which must be quite filled, tightly covered, and kept in a cool place.

Lard consists of about thirty-eight per cent. tri-stearin and tri-palmitin, and sixty-two per cent. tri-olein. Its composition, color, and keeping qualities vary considerably, however. The best lard is that taken from young animals in the coldest months of the year, when it is more firm and white, and keeps better. Lard melts at from 30° to 35° C., according to the percentage of olein, the best lard being that with the higher melting-point, which is the only kind sanctioned by the Pharmacopœia.

After lard has once become rancid it cannot again be made fit for pharmaceutical purposes. Hence the necessity for preserving it well. The Pharmacopœia prescribes that it be preserved in "vessels impervious to fat." This is imperatively necessary if it has to be kept more than a week, or if the same vessel is used as a container for lard from week to week. Earthenware is easily penetrated by lard, and even glazed white jars soon become impregnated, so that these are not fit containers for lard or ointments. Glass alone is unexceptionable, though small, new tin cans will answer the purpose if tightly closed and filled only once. Whatever may be the receptacle used, it should be scrupulously cleaned, and every portion of the old stock removed from it, before refilling it. New lard, or a new lot of ointment containing lard, must never be allowed to come in contact with any leavings of the old lot.

Lard is the base of most of our ointments. It is, however, at best, a very unsatisfactory article for any pharmaceutical use, and it would

be a great improvement from the pharmacist's standpoint to substitute the soft petroleum paraffinoids, of which one is now officially recognized in the Pharmacopœia under the name of "Petrolatum." (See that title.) The only official ointment in which lard may be required (for chemical reasons) is the ointment of nitrate of mercury, and even this preparation might perhaps be better made with some other base. The keeping qualities of lard are so poor, and the melting point so low, that in the warmer portions of this country, and in summer, the use of lard becomes a positive nuisance. And yet it is questionable whether any perfect substitute for lard can be had when we take into consideration the well-known fact that no other fatty substances are able to soften and penetrate the skin as well as animal fats do. Lard and lard oil are far better mediums for inunction than olive oil, cotton-seed oil, petroleum paraffinoids (such as "vaseline," "cosmoline," "petrolina," etc.), or any other vegetable or mineral fatty matter.

Medicinal Uses.—Lard is mostly employed as an ingredient of ointments; but sometimes also for inunction in scarlatina and measles, so as to prevent the itching and the occurrence of complications, such as taking cold, scarlatinal dropsy, etc.

In fevers with hot, dry skin the inunction with lard reduces the temperature and pulse. It is very generally employed as a lubricant to the hot and dry membrane of the vagina in tedious or difficult labors, causing the parts to become soft and moist and facilitating the passage of the fœtus; it is also used as an inunction to facilitate the removal of the sebaceous substances from the surface of the newborn child.

Badly nourished, cachectic children are often much benefited by inunctions with lard or oils, and warm baths followed by inunctions of lard or cod-liver oil over the body, just before going to bed, will greatly improve the condition of delicate and spare women, who wish to gain fulness of form. The same treatment is of great benefit in cases of consumption, both by nourishing the patient and by preventing the taking cold by changes of temperature.

When taken internally it acts as a laxative, having this property in common with other oils and fats.

ADEPS BENZOINATUS; U. S.

Benzoinated Lard.

[*Benzoated Lard—Ointment of Benzoin* (1870).]

Tie thirty grams (1 ounce) of benzoin, in coarse powder, loosely, in a bag of coarse muslin and suspend it in one thousand five hundred grams

(50 ounces) of lard melted in a porcelain or tin vessel over a water-bath. The whole is stirred frequently, and the heat continued for two hours, the vessel being kept covered in the intervals between stirring, and care being taken not to allow the heat to exceed 60° C. (140° F.). Then the bag of benzoin is removed, and the benzoinated lard is strained and allowed to cool, stirring it constantly while cooling.

This is a good working formula. Still better, however, is to pick out whole pieces or tears, not smaller than peas, of clean, light-colored benzoin, free from foreign substances and from any small particles, and to put these pieces directly into the melted lard. In good benzoin it is quite easy to pick out good white "almonds" or "tears" of the resin from a freshly broken lump. The resin dissolves readily in the melted lard. It is necessary to stir the benzoinated lard constantly while cooling, because otherwise a granular product will be obtained. Constant stirring while cooling also makes the preparation whiter. The preparation should be white and possess a decided odor of benzoin.

Benzoinated lard keeps remarkably well, considering how rapidly lard itself spoils. It is not the benzoic acid in the benzoin which alone preserves the lard, but the very small quantity of volatile oil contained in the resin contributes to keep the preparation sweet. Other volatile oils preserve fats in the same way, but are more or less objectionable on account of their strong odor and irritating qualities. Oil of sassafras is used in the proportion of from one to four drops to the ounce to preserve some of the proprietary "all-healing" ointments sold in this country. Any of the balsamic resins will preserve fats equally as well as benzoin, such as tolu, peru, storax, etc., all of which contain either benzoic or cinnamic acid, or both. The fragrant resin of poplar buds is as efficient.

It is **used** for the same purposes generally as lard.

ADIPIS OLEUM; U. S.

Lard Oil.

Description.—See the Pharmacopœia, p. 232. Must be perfectly bland and free from rancidity. It does not keep long. Should be kept in a cold place.

Used for external application as an ingredient of liniments, etc. It is more easily absorbed than vegetable oils.

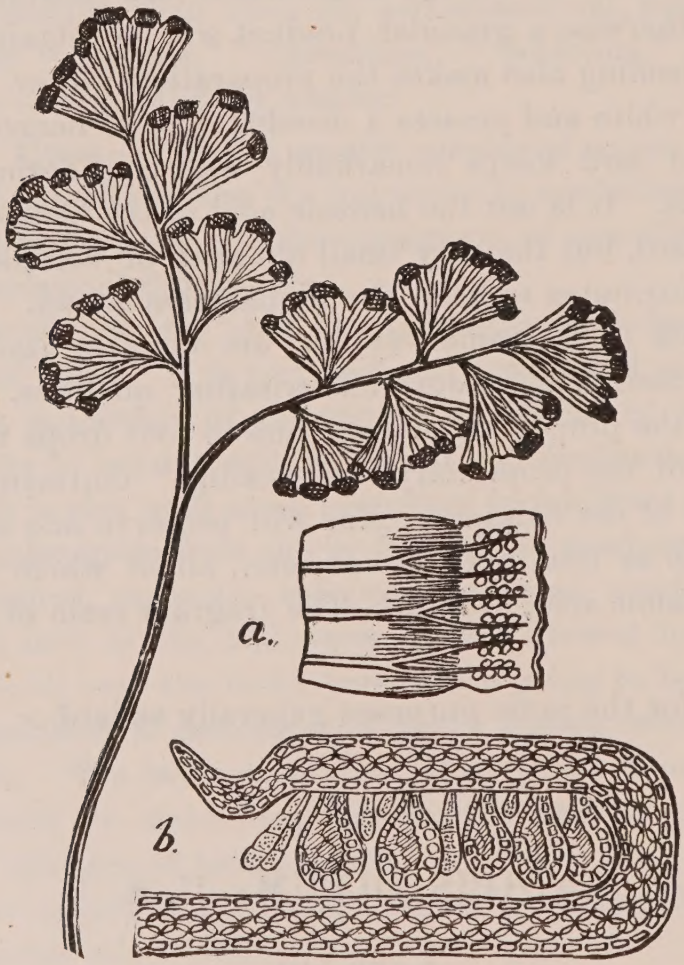
[ADIPIS] UNGUENTUM; U. S.

Ointment.

Unguentum Simplex—Simple Ointment.

Melt one hundred grams (3 ounces 230 grains) yellow wax, and then add gradually four hundred grams (14 ounces 48 grains) lard, stirring the mixture until cool.

It is curious that although Simple Ointment was prescribed already in the Pharmacopœia of 1870 to be made from *yellow* wax, the preparation is comparatively rarely seen other than *white*. The singular feature



Figs. 10–12.—Maidenhair Fern (p. 71), natural size; *a*, edge of frond flattened out, enlarged; *b*, section through edge of frond, enlarged, showing the insertion of sporangia.

about it is that an ointment made with yellow wax, as officially prescribed, is cheaper as well as better, and white ointment seems to be preferred solely on account of the color.

Used simply as a base for medicated ointments.

Adiantum.

ADIANTUM.—MAIDENHAIR FERN.

Adiantum pedatum, Linné (*Filices*).

Description.—Common in the woods in the United States, and its appearance is familiar. The illustration represents it better than a verbal description. It has a slight aromatic odor, a sweetish, somewhat bitter and astringent taste. It is demulcent and somewhat astringent.

Used in pulmonary catarrh and bronchorrhœa, in the form of a syrup.

ADIANTI SYRUPUS.

SYRUP OF ADIANTUM.

Infuse thirty grams (1 ounce) of the drug in three hundred cubic centimeters (10 fluidounces) of boiling water for half an hour. Strain. Dissolve five hundred grams (17 ounces 279 grains avoirdupois) sugar in the strained infusion. Used as an ingredient of expectorant mixtures.

Dose.—Five to twenty-five cubic centimeters (1 to 6 drachms) or more.

Æther; U. S.

ETHER.

Æther Sulphuricus—Aether, Schwefeläther, G.; *Ether hydrique, Ether sulfurique*, F.; *Eter, Eter sulfurico*, Sp.; *Ether*, Sw.; *Sulphuric Ether.*

Description and Tests.—See the Pharmacopœia, page 25. Containing about seventy-four per cent. ethyl oxide, and about twenty-six per cent. alcohol (with a little water) specific gravity 0.750 at 15° C. (59° F.).

ÆTHER FORTIOR; U. S.

STRONGER ETHER.

Containing about ninety-four per cent. ethyl oxide, and about six per cent. alcohol (with a little water).

Description and Tests.—See the Pharmacopœia, page 26. Its specific gravity is not over 0.725 at 15° C. (59° F.), or 0.716 at 25° C. (77° F.).

In trade, ether is generally called "sulphuric ether" to distinguish it from other ethers. The compound does not contain sulphuric acid, however, although sulphuric acid is used in its production, and, there-

fore, the name is incorrect and not analogous to such names as nitrous ether, butyric ether, etc.

The price-lists of chemical manufacturers include three kinds of ether, viz.: "sulphuric ether, U. S. P.," "washed sulphuric ether," and "concentrated sulphuric ether."

The "sulphuric ether, U. S. P." is, of course, understood to correspond to the standard of the Pharmacopœia for ether, which was the same in 1870 as in the new revision. The "sulphuric ether, washed" [Letheon] has a specific gravity of about 0.735 at 15° C. (59° F.). The "sulphuric ether, concentrated" has a specific gravity of 0.733 to 0.725. Absolute ether has a specific gravity of 0.710 to 0.712 at 20° C. (68° F.) to 25° C. (77° F.).

According to Boullay, absolute ether (ethyl oxide) is soluble in fourteen parts of water, and, on the other hand, it dissolves one thirty-sixth part of its weight of water—that is, water is soluble in thirty-six parts of ether. Pharmacopœial "stronger ether" requires only eight parts of water to dissolve it.

Ether freely dissolves iodine and bromine, fixed and volatile oils, many resins, corrosive sublimate, etc. It dissolves sulphur and phosphorus less freely. It must be preserved in well-stoppered bottles [or sealed tin cans] in a cool place, and where no fire or flame can ignite its vapor, as it is extremely inflammable. The vapor of ether mixed with air in certain proportions produces a powerful explosive mixture. This circumstance renders the use of ether as an anæsthetic extremely hazardous at night, as in child-bed cases, puerperal convulsions, etc., in which cases chloroform is preferred on this account.

As the tension of ether gas varies considerably with the temperature, the bottles, tin cans, or other containers in which ether or any ethereal tincture or other liquid, as, for instance, collodion, is put, ought not to be over two-thirds filled.

Medicinal Uses.—Ether is a valuable diffusible stimulant. Given internally it produces a sense of burning or warmth, followed by a sensation of cooling. Increased action of the heart, flushing of the face, and diaphoresis follow very soon. There is a state of exhilaration, shortly after followed by a period of quiet, and sleep may be produced. The effects resemble the intoxication by alcohol, but are more quickly produced and more transient in their nature.

Ether is used internally in syncope (sudden failure of the heart's action); in spasmodic asthma; in flatulent colic; in the painful symptoms caused by the passage of renal or bilious calculi; in hysteria; hysterical convulsions, etc. It is also given as an inhalation to meet the same indications. In cases of collapse from any cause, as in poisoning,

or syncope, or extreme debility following excessive loss of blood, shock, etc., ether may be given by subcutaneous injection, and is the promptest stimulant for such cases, even taking the place of transfusion of blood in some cases.

Dose.—Internally, two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm), suspended in syrupy or mucilaginous liquid. For hypodermic injection, fifteen minims (1 cubic centimeter), repeated at short intervals, if necessary, half a dozen times or more.

Ether as an Anæsthetic.—When inhaled the vapor of ether produces total relaxation of the muscular system with complete loss of consciousness or sensation. It is, therefore, used as an anæsthetic in surgical operations. It must be pushed to its full extent quickly, by causing the patient to inhale as much of the vapor as possible. It sometimes produces nausea and vomiting, especially if the patient ate shortly before its administration. The patient should, therefore, not eat anything for some time before the operation. Ether is preferred as an anæsthetic by many, as its administration is claimed to be accompanied by less danger than the use of chloroform.

Locally a stream of the vapor in the form of spray from the rubber spray apparatus causes insensibility of the skin, and is used in this manner for minor operations, as opening abscesses, cutting out ingrown nails, etc.

ÆTHERIS SPIRITUS; U. S.

SPIRIT OF ETHER.

Æther Spirituosus—Hoffman's Anodyne without Ethereal Oil of Wine.

A mixture of three hundred grams (14 fluidounces) Stronger Ether and seven hundred grams (29 fluidounces) alcohol. The preparation is new to the U. S. Pharmacopœia, and was introduced because it is believed that many prefer Hoffman's anodyne without the ethereal oil of wine, and because most of the Hoffman's anodyne sold or dispensed is actually prepared by this formula.

Dose.—Two to five centimeters (30 to 80 minims). Best kept in glass-stoppered bottles in a cool place away from any flame.

Æther Aceticus; U. S.

ACETIC ETHER.

Essigäther, G.; *Ether acétique*, F.; *Eter Acetico*, Sp.; *Ättikether*, Sw.

Description and Tests.—See the Pharmacopœia, pages 25 and 26. A colorless inflammable liquid of a refreshing odor, reminding

somewhat of acetic acid and ether. Should be carefully preserved in well-stoppered bottles in a cool place, and away from all lights or fire, the bottles containing it to be only two-thirds full. It is a constituent of the tinctura ferri acetatis, which is now for the first time official in the U. S. Pharmacopœia (see Tinctura Ferri Acetatis).

Acetic ether is used in making certain artificial fruit flavors, and also as a refreshing addition to cologne water for use in the sick-room.

Æthereum Oleum; U. S.

Ethereal Oil.

Heavy Oil of Wine.

The preparation consists of equal volumes of heavy oil of wine and stronger ether. As few pharmacists will prepare their own ethereal oil, we omit here the process of its preparation. (See the Pharmacopœia, page 232.) It is pale straw-colored. For further description see the Pharmacopœia.

Only used as an ingredient of the following preparation.

ÆTHERIS SPIRITUS COMPOSITUS; U. S.

Compound Spirit of Ether.

Hoffman's Anodyne.

Mix three hundred grams (14 fluidounces) stronger ether, six hundred and seventy grams (28 fluidounces) alcohol, and thirty grams (1 ounce 25 grains) ethereal oil. Must be kept in well-stoppered bottles, not more than three-fourths full, away from lights and fire, and in a cool place.

Dose.—0.5 to four cubic centimeters (10 to 60 minims).

Ætheris Nitrosi Spiritus; U. S.

Spirit of Nitrous Ether.

Spiritus Nitri Dulcis.—Sweet Spirit of Nitre.

Preparation, Description, and Tests.—See the Pharmacopœia, pages 304 and 305. This preparation must be kept "in small, glass-stoppered vials, in a dark place, remote from lights or fire." It consists of alcohol, aldehyd, water, ethyl acetate, and ethyl nitrite. It is best preserved in amber bottles of one hundred grams capacity or less. The

Pharmacopœia requires at least four per cent. ethyl nitrite. The greater the percentage of ethyl nitrite the yellower is the liquid.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Ætherolea.

VOLATILE OILS.

The title "Ætheroleum" is applied to volatile oils in the pharmacopœias of Sweden, Norway, and Denmark. In all other pharmacopœias the title "Oleum" is applied to fixed oils (real *oils*) and "volatile oils" indiscriminately. That the so-called *volatile oils* are not oils in any sense whatever, is universally recognized. These two classes of substances—oils and volatile oils—have no properties in common beyond the fact that both are usually liquid. There would be as great propriety in calling glycerin, sulphuric acid, ether, or water, *oil*, as in giving any volatile oil that title. Moreover, many plants contain both fixed and volatile oils. We have oils and volatile oils of almonds, mustard seed, nutmeg, etc. It would seem, therefore, to be highly desirable that our pharmaceutical nomenclature should make proper distinction between these essentially different classes of bodies. The best title so far recommended for the volatile oils is the one which has been in actual use in the pharmacopœias named for nearly a century. The necessity of a distinction crops out in the adjectives—"volatile," "essential," "ethereal," etc., which have been used in connection with the word "oleum" to designate *volatile oils*. In the living languages there is actually no one single word yet set apart as a title for these interesting compounds. Attention is called to the subject here for the purpose of inviting discussion of an exceedingly important practical question, and to familiarize our readers with the only suitable title yet proposed.

The title "ætheroleum" has been objected to for three reasons: first, because it is a long and unfamiliar term, but it is no longer than oleoresin, suppositories, etc., and we cannot expect that a new term (and a *new* term *must* be used) will sound familiar; the second objection is that the first part of the word *æther*oleum suggests that the volatile oil contains ether or has some connection with ether, but that, we think, is hypercritical; the third objection is that we would still say "oleum." But it is not claimed that the term "ætheroleum" is the best that can be found—it is simply the *only* intelligible title yet used or proposed, if we except the term "otto" (or "attar"), which has had a limited application in perfumery, and those made up of more than one word.

Agaricus Albus.

WHITE AGARIC.

Boletus Laricis—*Lärchenschwamm*, G.; *Agaric blanc, Agaric purgatif*, F.; *Agarico Blanco*, Sp.; *Lärkträdswamp*, Sw.; *Purging Agaric.*

Origin.—*Polyporus officinalis*, Linné (*Fungi*).

Habitat.—Europe.

Description.—A fungus growing on the trunks of old larch trees. As found in the shops it is broken up into irregular pieces, the outer rind having been removed, and is of a dirty-white color, light in weight, of a close, fibrous texture, difficult to powder. The odor resembles that of new flour; the powder causes violent sneezing. The taste is at first sweetish, but finally very acrid and disagreeably and persistently bitter.

Agaric is often damaged by an insect (Anobium festivum). Very hard and dense pieces of a yellow color should be rejected, and also such as have become tasteless by age. Contains from thirty-six (Bley) to seventy-two (Braconnot) per cent. of resins. Bucholz found forty-nine per cent. One of the resins, soluble in cold alcohol, is intensely bitter. Schoonbroodt found a white, crystalline substance, *agaricin*, which has, at first, an insipid, then sweet, then bitter, and finally acrid taste.

Agaric acid has also been found in the drug, crystallizing in needles, nearly insoluble in water, but freely soluble in alcohol.

Medicinal Uses.—Was formerly used as a drastic purgative in doses of from two to four grams (30 to 60 grains). Lately used in doses of ten to twenty centigrams (1½ to 3 grains), to check sweating.

Agaricus Chirurgorum.

SURGEONS' AGARIC.

Feuerschwamm, Zunder, G.; *Bolet amadouvier*, F.; *Agarico de Encina*, Sp.; *Fnöskswamp*, Sw.; *Spunk.*

Origin.—*Polyporus fomentarius*, Fries (*Fungi*).

Habitat.—The best surgeons' agaric is collected from beech-trees in Sweden, Bohemia, Hungary, and Switzerland. That growing on birches or on oaks is not so good.

Part used.—The interior of the fungus.

Description.—It is thin, soft, velvety, rust brown. Before being fit for use it must be soaked in hot, weak lye, then boiled, and finally beaten with mallets. As thus prepared, it occurs in light, thin, yellow-

ish brown, soft and pliable flat pieces, with somewhat corrugated surfaces and margins, not glossy. Has no odor nor taste. It is almost pure cellulose. Hard, uneven surgeons' agaric is useless.

Uses.—It is an excellent mechanical hæmostatic, causing coagulation by the absorption of a portion of the fluid constituents of the blood. (When used as a tinder it is first soaked in a strong solution of potassium nitrate and dried.)

Agrimonia.

AGRIMONY.

Herba Agrimoniæ—*Odermennig, Leberplette*, G.; *Aigremoine, Eupatoire des Grecs*, F.; *Agrimonia*, Sp. and Sw.

Origin.—*Agrimonia Eupatoria*, Linné (*Rosaceæ*).

Habitat.—Europe and North America.

Parts used.—The whole plant.

Description.—A simple stem with green leaves about twelve and one-half centimeters (5 inches) long, pinnate, with coarsely toothed leaflets; flowers yellow. Odor feebly aromatic; taste astringent, somewhat bitter.

Constituents.—Tannin, about four or five per cent.

Uses.—Stimulant, astringent. Internally in hemorrhages and diarrhœas. Externally as a wash for ulcers, as a gargle in sore-throat, and as a mouth-wash. It is also used in poultices, fomentations, and injections.

Dose.—Two to ten grams ($\frac{1}{2}$ to $2\frac{1}{2}$ drachms). Best in the form of fluid extract.

AGRIMONIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF AGRIMONIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a menstruum use diluted alcohol.

Moisten the drug with two hundred grams (about $7\frac{1}{2}$ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then

dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Dose.—Two to eight cubic centimeters (½ to 2 fluidrachms).

Ailanthus.

AILANTHUS.

Ailanthi Cortex—Ailanthus Bark.—Götterbaum, G. ; *Tree of Heaven, Chinese Sumach.*

Origin.—*Ailanthus glandulosa*, Desfontaines (*Simarubaceæ*).

Habitat.—North America, Europe, and Asia.

Part used.—The bark.

Description.—Externally brownish-gray, nearly smooth when young ; internally brownish-yellowish. Or the corky layer is removed and the bark yellowish on both surfaces. Fibrous. Older bark is externally beautifully marked by wavy, broad, rough, longitudinal ridges of dark blackish-gray color, the middle bark is light yellowish-brown, porous, brittle, and the inner bark of the same color, is marked by fine longitudinal striæ. Odor feeble. Taste very bitter.

Constituents.—*Ailanthic acid*, the calcium salt of which is said to impart the bitterness to the drug. A little volatile oil and tannin have also been found in it.

Uses.—Bitter tonic and stomachic. Employed in atonic conditions of the digestive organs, atonic dyspepsia, want of appetite, etc. It also possesses tænicide properties.

Dose.—0.5 to 2 grams (8 to 30 grains), best given in fluid extract.

AILANTHI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF AILANTHUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a menstruum use a mixture of two hundred grams (about 8⅓ fluidounces) alcohol, and one hundred grams (about 3⅓ fluidounces) water.

Moisten the drug with two hundred grams (about 7 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Dose.—0.50 to 2 cubic centimeters (8 to 30 minims).

Akazga.

AKAZGA.

Boundon, Ikaju, Quai.

Origin.—Probably a species of Strychnos.

Habitat.—Western Africa.

Part used.—The bark.

Description.—Orange yellowish, light red in spots, covered with yellow tubercles. The inner surface light brown, and characterized by a layer of hardened parenchyma. Inodorous. Very bitter.

Constituents.—An alkaloid called *akazgine,* which is intensely bitter, extremely poisonous, and resembling strychnine in its action.

No uses have been made of this drug. Its effects resemble those of nux vomica. In Africa it is used to prepare an ordeal drink.

Alcohol.

ALCOHOL.

Spiritus Vini—Rectified Spirit ;— Weingeist, G.; *Alcool,* F.; *Alcohol,* Sp.; *Sprit,* Sw.

Source.—Obtained by fermentation, directly or indirectly, from substances rich in sugar, starch, or inulin, the alcohol formed being separated by distillation.

Properties.—Pure alcohol is a colorless, transparent, volatile liquid of a peculiar odor and sharp taste. It has a perfectly neutral reaction toward litmus paper moistened with water. It boils at 78° C. (183° F.), readily ignites, and burns with a blue flame and without smoke.

Alcohol is an indispensable and widely useful solvent. In pharmacy it is employed to extract alkaloids, resinous substances, volatile oils, neutral principles, etc., and to dissolve many substances which are not acted upon by water. Camphor, iodine, castor oil, phosphorus, potassa, a great number of salts, etc., are more or less soluble in alcohol.

Alcohol mixes clear and in all proportions with water, ether, glycerin, or chloroform.

Tests.—On evaporating fifty cubic centimeters (about $1\frac{2}{3}$ fluidounce) of the alcohol in a small capsule no residue must be left. Mix ten cubic centimeters ($2\frac{1}{2}$ fluidrachms) of the alcohol with ten cubic centimeters of water and two cubic centimeters ($\frac{1}{2}$ fluidrachm) glycerin, soak a piece of blotting-paper in the mixture, and then dry it; after the alcohol has evaporated from the wet paper no foreign odor should be present. Concentrate ten cubic centimeters ($2\frac{1}{2}$ fluidrachms) of the mixture by evaporation to two cubic centimeters ($\frac{1}{2}$ fluidrachm), and then add to it two cubic centimeters ($\frac{1}{2}$ fluidrachm) of strong sulphuric acid; no reddish coloration should appear. Both these tests are intended to discover fusel oil, which has an irritating odor and can be recognized by it if present only to the extent of one-tenth per cent., and which is colored red by sulphuric acid. Aldehyd, if present, is detected by a dark coloration, which appears after adding to the alcohol an equal volume of solution of potassa.

Preservation.—Being inflammable and volatile it must be kept in tightly stoppered bottles, in a cool place, and where it will be safe from any flame or fire.

Strength of Alcohol.—Its strength is most conveniently determined by means of the alcoholometer (with jar), which can be purchased with double scale, showing percentage and degrees proof, and combined with a thermometer for ascertaining the temperature at the same time that the degree is read off. The scales of the alcoholometer register correctly only at the standard temperature to which they were adjusted. In the United States alcohol is bought and sold with reference to the percentage by measure of absolute alcohol it contains. In the collection of the revenue the term "proof-spirit" signifies a spirit containing fifty per cent. by measure of absolute alcohol—that is, an alcohol of which one hundred gallons contain fifty gallons of absolute alcohol. Each degree above or below *proof* represents one-half per cent. more or less. Thus one hundred degrees above proof represents fifty per cent. more of absolute alcohol than proof-spirit contains; or, in other words, one hundred per cent. absolute alcohol, or *all* absolute alcohol. On the other hand, one hundred degrees below proof means fifty per cent. less of absolute alcohol than is contained in proof-spirit; or, in other words, no alcohol at all, or all water. As "proof-spirit" is denoted as "one hundred degrees," it will be seen that absolute alcohol is two hundred degrees (being one hundred degrees *above* "proof"), while water is 0° (being one hundred degrees *below* "proof"). The pharmacopœial "alcohol," which is the strongest alcohol generally produced at the distilleries,

is one hundred and eighty-eight degrees, or eighty-eight degrees above proof, and contains forty-four (one-half of eighty-eight) per cent. more of absolute alcohol than proof-spirit contains, and as proof-spirit contains fifty per cent. the alcohol described contains fifty plus forty-four, or ninety-four per cent. by volume of absolute alcohol. To ascertain the volume percentage strength, the most convenient and direct method will be to use the alcoholometer combining Tralle's scale (which shows the per cent. by volume direct) and the U. S. Custom-House standard scale (which shows the degree above or below proof), with thermometer, and scale for corrections for variations of temperature. In our country the standard temperature to which the scale of the alcoholometer is adjusted is sixty degrees Fahrenheit (15.55° C.). When the spirit tested is of exactly that temperature, that degree on the scale which coincides with the level of the liquid in the jar when the instrument is suspended in it will indicate exactly the strength of the spirit. But if the temperature is above 60° F. the indication on the alcoholometer will be higher than the actual strength of the alcohol by one-fifth per cent. for every degree above the standard temperature (60° F.); and if below 60° F. the actual strength of the alcohol will be greater than shown by the alcoholometer, the error being in this case also one-fifth per cent. for every degree of variation of the temperature from the standard. Thus, if the thermometer shows 65° F. and the alcoholometer scale reads off eighty per cent., the difference in temperature being five degrees, five times one-fifth (or one) per cent. must be deducted from the reading, leaving seventy-nine per cent. as the actual strength.

The pharmacist may also use the specific gravity bottle, or the ordinary areometer for liquids lighter than water, to find the specific gravity of the spirit, and afterward by reference to the following table, the corresponding strength. This table is prepared with reference to a standard temperature of 15.55° C. (60° F.):

Specific Gravity.	100 Measures Spirit Contain—		Contraction of Volume Measures.	Specific Gravity.	100 Measures Spirit Contain—		Contraction of Volume Measures.
	Measures of Absolute Alcohol.	Measures of Water.			Measures of Absolute Alcohol.	Measures of Water.	
1.0000	0	100.000	——	.9902	7	93.458	.458
.9985	1	99.055	.055	.9890	8	92.543	.543
.9970	2	98.111	.111	.9878	9	91.629	.629
.9956	3	97.176	.176	.9866	10	90.714	.714
.9942	4	96.242	.242	.9854	11	89.799	.799
.9928	5	95.307	.307	.9843	12	88.895	.895
.9915	6	94.382	.382	.9832	13	87.990	.990

Specific Gravity.	100 Measures Spirit Contain—		Contraction of Volume Measures.	Specific Gravity.	100 Measures Spirit Contain—		Contraction of Volume Measures.
	Measures of Absolute Alcohol.	Measures of Water.			Measures of Absolute Alcohol.	Measures of Water.	
.9821	14	87.086	1.086	.9178	58	45.693	3.693
.9811	15	86.191	1.191	.9156	59	44.678	3.678
.9800	16	85.286	1.286	.9134	60	43.664	3.664
.9790	17	84.392	1.392	.9112	61	42.649	3.649
.9780	18	83.497	1.497	.9090	62	41.635	3.635
.9770	19	82.603	1.603	.9067	63	40.610	3.610
.9760	20	81.708	1.708	.9044	64	39.586	3.586
.9750	21	80.813	1.813	.9021	65	38.561	3.561
.9740	22	79.919	1.919	.8997	66	37.526	3.526
.9729	23	79.014	2.014	.8973	67	36.492	3.492
.9719	24	78.119	2.119	.8949	68	35.457	3 457
.9709	25	77.225	2.225	.8925	69	34.423	3.423
.9698	26	76.320	2.320	.8900	70	33.378	3.378
.9688	27	75.426	2.426	.8875	71	32.333	3.333
.9677	28	74.521	2.521	.8850	72	31.289	3.289
.9666	29	73.617	2.617	.8825	73	30.244	3.244
.9655	30	72.712	2.712	.8799	74	29.190	3.190
.9643	31	71.797	2.797	.8773	75	28.135	3.135
.9631	32	70.883	2.883	.8747	76	27.080	3.080
.9618	33	69.958	2.958	.8720	77	26.016	3.016
.9605	34	69.034	3.034	.8693	78	24.951	2.951
.9592	35	68.109	3.109	.8666	79	23.877	2.877
.9579	36	67.184	3.184	.8639	80	22.822	2.822
.9565	37	66.250	3.250	.8611	81	21.747	2.747
.9550	38	65.305	3.305	.8583	82	20.673	2.673
.9535	39	64.361	3.361	.8555	83	19.598	2.598
.9519	40	63.406	3.406	.8526	84	18.514	2 514
.9503	41	62 451	3.451	.8496	85	17.419	2.419
.9487	42	61.497	3.497	.8466	86	16.324	2.324
.9470	43	60.532	3.532	.8436	87	15.230	2.230
.9452	44	59.558	3.558	.8405	88	14.121	2.121
.9435	45	58.593	3.593	.8373	89	13.011	2.011
.9417	46	57.618	3.618	.8339	90	11.876	1.876
.9399	47	56.644	3.644	.8306	91	10.751	1.751
.9381	48	55.669	3.669	.8272	92	9.617	1.617
.9362	49	54.685	3.685	.8237	93	8.472	1.472
.9343	50	53.700	3.700	.8201	94	7.318	1.318
.9323	51	52.705	3.705	.8167	95	6.153	1.153
.9303	52	51.711	3.711	.8125	96	4.968	.968
.9283	53	50.716	3.716	.8084	97	3.764	.764
.9263	54	49.722	3.722	.8041	98	2.539	.539
.9242	55	48.717	3.717	.7995	99	1.285	.285
.9221	56	47.712	3.712	.7946	100	0.	——
.9200	57	46.708	3.708				

When alcohol and water are mixed the temperature of the liquids rises while the volume contracts. The greatest contraction of volume

takes place when 52.3 measures of absolute alcohol are mixed with 47.7 measures of water, the total volume being only 96.23 measures instead of one hundred. The volume of this mixture, therefore, when either water or alcohol is added, expands beyond the added measure.

As seen from the above table it requires fifty-four measures of absolute alcohol and 49.722 measures of water to make one hundred measures of spirit of 0.9263 specific gravity, the contraction of volume being thus 3.722 volumes (nearly $3\frac{3}{4}$ per cent.). The table shows the volume per cent. of spirit, of any specific gravity named in the first column, and the specific gravity of alcohol, of any percentage strength named in the second column. It also shows how much water and how much alcohol of any given strength are necessary to make a given number of measures of spirit of any other strength, by very simple calculations. Thus, suppose you have alcohol of 0.820 specific gravity, and you desire to make ten gallons spirit of fifty per cent. strength (by measure). By reference to the table you find that alcohol of 0.820 specific gravity contains (at 60° F.) ninety-four per cent. of absolute alcohol. The rule is: multiply the percentage strength desired by the number of gallons to be made, and then divide the product by the percentage strength of the alcohol to be diluted. Thus, $\frac{50 \times 10}{94}$ (= 5.32). The quotient is the number of gallons of the stronger spirit which is required to make the desired quantity of the weaker spirit. It therefore requires 5.32 gallons of ninety-four per cent. alcohol to make ten gallons of fifty per cent. alcohol.

This rule is, in our opinion, preferable to that of the Pharmacopœia (see p. 89).

In the Pharmacopœia of 1870 there were three separate strengths of alcohol prescribed, viz.: "Alcohol Fortius"="Stronger Alcohol," "Alcohol," and "Alcohol Dilutum." The *Alcohol Fortius* was ninety-five per cent. (by volume) alcohol; specific gravity, 0.817. Alcohol of this strength is difficult to obtain, and as a ninety-four per cent. alcohol is sufficiently strong for pharmacopœial purposes the stronger alcohol was wisely dropped and the ninety-four per cent. alcohol, which is always readily obtainable, was substituted for it in the new Pharmacopœia.

The "Alcohol" of 1870 had a specific gravity of 0.835, and contained ninety per cent. of absolute alcohol. It was dropped as unnecessary, since any strength between the ninety-four per cent. alcohol and the official Diluted Alcohol may be readily mixed at any time when wanted for use. To make the alcohol of the standard of the Pharmacopœia of 1870, mix twenty (20) measures of ninety-four per cent. alcohol with one (1) measure of water; this will make the resulting mixture almost ex-

actly (lacking only one-thirtieth per cent. of water) ninety per cent. strength by volume.

The "Diluted Alcohol" of the old Pharmacopœia (1870) was a mixture of *equal measures* of ninety-five per cent. alcohol and distilled water. It had the specific gravity 0.941, and contained about forty-six and one-half per cent., by measure (thirty-nine per cent. by weight), of absolute alcohol, being nearly seventeen per cent. weaker than the now official Diluted Alcohol (U. S. P., 1880).

ALCOHOL ABSOLUTUM.

Absolute Alcohol.

This is nearly pure ethyl alcohol, containing over ninety-nine per cent. real absolute alcohol if properly made. It is prepared by mixing ninety-four per cent. alcohol with powdered unslaked lime, and distilling the mixture after a day's maceration.

Absolute alcohol has the specific gravity 0.794 at 15.55° C. (60° F.). It dissolves a number of resins, alkaloids, phosphorus, and other substances not readily dissolved by ordinary commercial alcohol.

ALCOHOL; U. S.

Alcohol.

The alcohol of the new Pharmacopœia (1880) is one hundred and eighty-eight degrees proof, or contains ninety-four per cent. by volume of absolute alcohol, one hundred gallons of it containing ninety-four gallons absolute alcohol and 7.318 gallons water (the contraction of volume in combining the two liquids in the proportions named being 1.318 gallon). The statement in the Pharmacopœia that it contains six per cent. by volume of water is to be understood as meaning that six per cent. by volume of the liquid consists of water if the contraction of volume be ignored. One hundred pounds of it contain ninety-one pounds absolute alcohol and nine pounds water. It has the specific gravity 0.820 at 15.6° C. (60° F.) and 0.812 at 25° C. (77° F.).

To state the strength of alcohol by volume (measure) has the disadvantage of being always incorrect, for as the volume of the mixture of alcohol and water contracts it is practically impossible to know the relative proportions by volume of the two component parts of the liquid. We do not know whether both the alcohol and the water contract, or only

one of them, nor could the contraction of each be measured separately if both are condensed, as is probably the case. Hence we really do not know how great a proportion of the space occupied by the liquid is taken up by the alcohol in it, and how much by the water; and all that we do know is the space that the absolute alcohol in it occupies *when separated from the water*. In other words, we know that one hundred gallons of official alcohol of 0.820 specific gravity at 15.6° C. (60° F.) will result from ninety-four gallons of absolute alcohol and enough water to make up the one hundred gallons, which will require not six gallons but 7.318 gallons.

The per cent. by weight, however, may always be correctly ascertained.

Relation of Volume to Weight of the Official Alcohol.

At about 15.6° to 22° C. (60° to 71.6° F.) *the following equivalents of alcohol are approximately correct:*

1 liter (1,000 cubic centimeters)	weighs	816 grams.
1 U. S. pint	"	6,000 grains.
1 imperial pint	"	7,200 grains.
1,000 grams	measure	1,220 cubic centimeters.
16 troyounces	"	$20\frac{2}{3}$ U. S. fluidounces.
16 avoirdupois ounces	"	$18\frac{8}{10}$ U. S. fluidounces, or $19\frac{2}{3}$ imp. fluidounces.

At 15.6° C. (60° F.) *the following equivalents of alcohol are exact:*

1 liter	weighs	820 grams.
1 pint (U. S.)	"	$13\frac{2}{3}$ avoirdupois ounces.
100 avoirdupois ounces	measure	117 U. S. fluidounces (or 122 imp. fluidounces).
100 troyounces	"	128 U. S. fluidounces (or 134 imp. fluidounces).

At 25° C. (77° F.) *the following equivalents of alcohol are exact:*

1 liter	weighs	812 grams.
1 U. S. pint	"	13.53 avoirdupois ounces.
100 avoirdupois ounces	measure	118 U. S. fluidounces (or 123 imp. fluidounces).
100 troyounces	"	129 U. S. fluidounces.

Table showing the volume measure of different quantities, by weight, of the official alcohol (0.812 *specific gravity at* 25° C., or 77° F.).

Grams.	Avoirdupois weight.	Cubic centimeters.	Fluid-drachms.	Grams.	Avoirdupois weight.	Cubic centimeters.	Fluid-ounces.
1	15.43 grs.	1.23	0.33	200	7 ozs. 24 grs.	246.76	8.34
2	30.86 grs.	2.47	0.67	225	7 ozs. 409¾ grs.	277.60	9.38
3	46.30 grs.	3.70	1.00	250	8 ozs. 358 grs.	308.44	10.43
4	61.73 grs.	4.94	1.33	275	9 ozs. 306¼ grs.	339.28	11.47
5	77.16 grs.	6.17	1.67	300	10 ozs. 255 grs.	370.13	12.52
6	92.59 grs.	7.40	2.00	325	11 ozs. 203¼ grs.	400.97	13.56
7	108.03 grs.	8.64	2.33	350	12 ozs. 151½ grs.	431.82	14.60
8	123.46 grs.	9.87	2.67	375	13 ozs. 99½ grs.	462.66	15.64
9	138.89 grs.	11.10	3.00	400	14 ozs. 48 grs.	493.51	16.69
10	154.32 grs.	12.34	3.34	425	14 ozs. 433¾ grs.	524.35	17.73
15	231.48 grs.	18.51	5.01	450	15 ozs. 382¼ grs.	555.20	18.77
20	308.65 grs.	24.67	6.67	475	16 ozs. 330½ grs.	586.04	19.81
			Fluid-ounces.	500	17 ozs. 279 grs.	616.89	20.86
				525	18 ozs. 227 grs.	647.73	21.90
25	385.81 grs.	30.84	1.04	550	19 ozs. 175½ grs.	678.58	22.95
30	1 oz. 25½ grs.	37.01	1.25	575	20 ozs. 124 grs.	709.42	24.00
35	1 oz. 102⅜ grs.	43.18	1.46	600	21 ozs. 72½ grs.	740.27	25.03
40	1 oz. 180 grs.	49.35	1.67	650	22 ozs. 406½ grs.	801.96	27.12
45	1 oz. 257 grs.	55.52	1.87	700	24 ozs. 303 grs.	863.65	29.20
50	1 oz. 334 grs.	61.69	2.08	750	26 ozs. 199½ grs.	925.34	31.29
55	1 oz. 411 grs.	67.86	2.29	800	28 ozs. 96 grs.	987.00	33.38
60	2 ozs. 50½ grs.	74.03	2.50	850	29 ozs. 430 grs.	1,048.69	35.46
65	2 ozs. 127½ grs.	80.19	2.71	900	31 ozs. 327 grs.	1,110.41	37.55
70	2 ozs. 205 grs.	86.36	2.92	950	33 ozs. 223½ grs.	1,172.09	39.63
75	2 ozs. 282 grs.	92.53	3.13	1,000	35 ozs. 120 grs.	1,233.78	41.72
80	2 ozs. 359 grs.	98.70	3.33	1,500	52 ozs. 399 grs.	1,850.67	62.58
85	2 ozs. 436¾ grs.	104.87	3.54	2,000	70 ozs. 240 grs.	2,467.57	83.44
90	3 ozs. 76½ grs.	111.04	3.75	2,500	88 ozs. 82 grs.	3,084.45	104.30
95	3 ozs. 153½ grs.	117.21	3.96	3,000	105 ozs. 360 grs.	3,701.35	125.16
100	3 ozs. 230¾ grs.	123.38	4.17	4,000	141 ozs. 42½ grs.	4,935.13	166.88
125	4 ozs. 179 grs.	154.22	5.21	5,000	176 ozs. 162½ grs.	6,168.92	208.60
150	5 ozs. 127 grs.	185.07	6.26	10,000	352 ozs. 325 grs.	12,337.85	417.20
175	6 ozs. 75¼ grs.	215.91	7.30				

Weight of a barrel of ninety-four per cent. alcohol, net.

		At any temperature.
40	gallons at the standard temperature weighs.....	273⅓ pounds.
40½	" " " "	276¾ "
41	" " " "	280⅙ "
41½	" " " "	283½ "
42	" " " "	287 "
42½	" " " "	290⅖ "
43	" " " "	293⅘ "
43½	" " " "	297¼ "
44	" " " "	300⅔ "
44½	" " " "	303 7/10 "

Weight of a barrel of ninety-four per cent. alcohol, net.—Continued.

					At any temperature.	
45	gallons at the	standard	temperature	weighs	307½	pounds.
45½	"	"	"	"	310 9/10	"
46	"	"	"	"	314⅓	"
46½	"	"	"	"	317¾	"
47	"	"	"	"	321⅙	"
47½	"	"	"	"	324½	"
48	"	"	"	"	328	"
48½	"	"	"	"	331⅖	"
49	"	"	"	"	334⅘	"
49½	"	"	"	"	337¼	"
50	"	"	"	"	341⅔	"

The most convenient way to ascertain the correctness of stated contents of barrels of alcohol is to find the net weight, which, if the strength of the alcohol is known, will always furnish reliable data for calculating the measure. The gauger's certificates on the alcohol barrels are generally pretty correct if the barrel and contents have been recently gauged; but as a rule it will be found profitable to weigh every barrel immediately upon receiving it, then empty it into suitable receptacles, after which weigh the empty barrel; then deduct the weight of the barrel from the gross weight to get the net weight of the alcohol, which should correspond with the figures given in the above table, and will do so if the alcohol is of proper strength, and if the number of gallons be as stated. The weights given refer to alcohol of 0.820 specific gravity 15.6° C. (60° F.), and measured at that temperature. It is obvious that although forty-five gallons of alcohol at 60° F. will measure more than forty-five gallons at a higher, and less than forty-five gallons at a lower temperature, it will weigh exactly the same number of pounds at any temperature, viz.: three hundred and seven and one-half pounds, if of ninety-four per cent. strength. If stronger than ninety-four per cent. it will weigh less, and if weaker, more, and hence it is necessary to find also its strength by means of the alcoholometer at 60° F.

ALCOHOL DILUTUM; U. S.

Diluted Alcohol.

The diluted alcohol of the new Pharmacopœia (1880) is one hundred and six degrees proof, or contains fifty-three per cent. by volume of absolute alcohol, one hundred gallons of it containing fifty-three gallons

of absolute alcohol, and 50.716 gallons of water, the contraction of volume in combining the two liquids in these proportions being 3.716 gallons. One hundred pounds of it contains forty-five and one-half pounds of absolute alcohol, and fifty-four and one-half pounds water. Its specific gravity is 0.928 at 15.6° C. (60° F.), and 0.920 at 25° C. (77° F.). It is about seventeen per cent. stronger that the diluted alcohol of the old Pharmacopœia (1870), which contained only about forty-six and one-half per cent. by volume of absolute alcohol.

Relation of Weight to Volume of the Official Diluted Alcohol.

At about 15.6° to 25° C. (60° to 77° F.) *the following equivalents of diluted alcohol are approximately correct:*

1 liter (1,000 cubic centimeters)	weighs	about	924 grams.
1 U. S. pint	"	"	6,800 grains.
1 imperial pint	"	"	8,000 grains.
1,000 grams	measure	"	1,075 cubic centimeters.
16 troyounces	"	"	18$\frac{1}{6}$ U. S. fluidounces.
16 avoirdupois ounces	"	"	16$\frac{2}{3}$ U. S. fluidounces (or 17$\frac{1}{4}$ imp. fluidounces).

At 15.6° C. (60° F.) *the following equivalents of diluted alcohol are approximately correct:*

1 liter	weighs	928 grams.
1 U. S. pint	"	15.47 avoirdupois ounces.
100 avoirdupois ounces	measure	103$\frac{1}{3}$ U. S. fluidounces (or 107$\frac{2}{3}$ imp. fluidounces).
100 troyounces	"	113$\frac{1}{3}$ U. S. fluidounces (or 118 imp. fluidounces).

At 25° C. (77° F.) *the following equivalents of diluted alcohol are approximately correct:*

1 liter	weighs	920 grams.
1 U. S. pint	"	15$\frac{1}{3}$ avoirdupois ounces.
100 avoirdupois ounces	measure	104$\frac{1}{3}$ U. S. fluidounces (or 108$\frac{2}{3}$ imp. fluidounces).
100 troyounces	"	114$\frac{1}{3}$ U. S. fluidounces (or 119 imp. fluidounces).

Table showing the volume measure of different quantities, by weight, of the official diluted alcohol (0.920 *specific gravity at* 25° *C., or* 77° *F.*).

Grams.	Ounces and Grains.	Cubic centimeters.	Fluid-ounces.	Grams.	Ounces and Grains.	Cubic centimeters.	Fluid-ounces.
30	1 oz. 25½ grs.	32.25	1.09	175	6 ozs. 75¼ grs.	188.12	6.36
40	1 oz. 180 grs.	43.00	1.45	200	7 ozs. 24 grs.	215.00	7.27
50	1 oz. 334 grs.	53.75	1.81	225	7 ozs. 409¾ grs.	250.87	8.17
60	2 ozs. 50½ grs.	64.50	2.18	250	8 ozs. 358 grs.	268.75	9.08
70	2 ozs. 205 grs.	75.25	2.54	275	9 ozs. 306¼ grs.	304.62	10.00
80	2 ozs. 359 grs.	86.00	2.90	300	10 ozs. 255 grs.	322.50	10.90
90	3 ozs. 76½ grs.	96.75	3.27	350	12 ozs. 151½ grs.	376.25	12.72
100	3 ozs. 230¾ grs.	107.50	3.63	400	14 ozs. 48 grs.	430.00	14.54
125	4 ozs. 179 grs.	143.37	4.54	500	17 ozs. 279 grs.	537.50	18.17
150	5 ozs. 127 grs.	161.25	5.45	1,000	35 ozs. 120 grs.	1,075.00	36.34

Rule for diluting alcohol to any given strength.—The rule given on page 83 is the most simple. That given in the Pharmacopœia for diluting alcohol of any higher strength to the official standard for diluted alcohol is also simple, and alcohol of any strength can be diluted to any lower percentage by a similar process. This rule is : 1. Find the percentage strength of the alcohol to be diluted (the per cent. by volume if the alcohol is to be diluted to a certain volumetric strength ; or the percentage strength of the alcohol by weight if the diluted alcohol is to be of a certain per cent. by weight). 2. Divide the number representing the percentage strength of the alcohol which is to be diluted by the number representing the percentage strength of the diluted alcohol to be made. 3. From the quotient so obtained subtract 1. 4. The remainder represents the number of parts of water (by weight or volume as the case may be) which must be added to each part of the alcohol to be diluted. Thus, for example : It is desired to dilute a ninety per cent. alcohol (by weight) to a strength of thirty per cent. (by weight). Divide 90 by 30; this gives 3 as the quotient; subtract 1 from this, which leaves 2. We thus find that two parts, by weight, of water must be added to each part, by weight, of ninety per cent. alcohol in order to get a thirty per cent. alcohol.

When the volumetric per cent. is referred to the process is the same, and the result shows how many measures of water must be added to each measure of the alcohol which is to be diluted; but the answers when the volumetric strength is referred to are not absolutely correct because the degree of contraction or expansion taking place produces a greater or less deviation. For most purposes, however, it is sufficiently correct.

Medicinal Uses.—Alcohol is one of the most valuable remedies, being a stimulant of great power and general applicability.

It is usually administered in the form of wine or liquor (whiskey or brandy), or in combination with other remedies, in tinctures, medicated wines, etc.

It is an article of common use in all countries and by all people, in the form of beverages produced by the fermentation of grain or fruit, or their juices. In moderate doses these beverages are similar in their action to spices and condiments, increasing the appetite and digestion, quickening the circulation, and promoting gland action, preventing tissue waste and favoring an accumulation of fat. Its moderate use is therefore of much benefit, especially to those who are weak and in poor physical condition. To a certain extent alcohol may be considered as a food in such cases.

The deleterious effects produced by drinking alcoholic beverages result mainly from the use of the stronger liquors, which coagulate and precipitate pepsin and bring about a condition of gastric irritation; or by drinking excessive quantities of the weaker alcoholic beverages, as beer or wine, which dilute the gastric juice and thereby prevent digestion.

In excessive doses alcohol produces intoxication, loss of co-ordination, mental excitement followed by stupor, and perhaps unconsciousness. Generally this effect gradually wears off as the alcohol is eliminated, but it may result in death by a suspension of respiration and circulation.

Sometimes long-continued habitual excess in drinking produces delirium tremens.

Alcohol is a valuable stomachic and tonic in atonic dyspepsia, indigestion, debility, and during convalescence from acute diseases. It is valuable in all low conditions when the pulse is weak, the tongue dry, digestion poor, and sleep unrefreshing. Such conditions exist in adynamic diseases, typhoid stages of various fevers, later stages of consumption, etc. Alcohol is best combined with egg, milk, etc., as egg-nog, milk-punch, and similar preparations.

In anæmic persons sleeplessness is often relieved by a dose of alcohol, as wine, brandy, toddy, beer, or ale before going to bed.

In consumption alcohol is a very valuable remedy, some observers going so far as to say that drunkards very seldom are afflicted with phthisis.

In *snake-bite* large quantities of whiskey can be taken without producing intoxication, and this treatment is one of the best in cases of that kind.

Externally, alcohol mixed with water is an excellent lotion to prevent bed-sores, to relieve pain in inflammation, and as a wash to ulcers and sores. The dose is difficult to state, as it depends on the condition of the patient as well as upon the form in which it is given.

Pure diluted alcohol is preferable to doubtful whiskey or brandy, and, in fact, to any of the ordinary liquors for medicinal purposes.

Alcohol Amylicum.

AMYLIC ALCOHOL.

Amylalcohol, Fuselöl, G.; *Alcohol amylique, Huile de Grain,* F.; *Finkelolja,* Sw.—*Fusel-oil, Potato-oil.*

Origin.—Fusel-oil is to be found in all unrectified alcohol made from potatoes, grain, or starch, in any form. It is not an oil, however, as the name would indicate, but an alcohol.

Description.—A colorless, clear liquid, with a penetrating, oppressive odor, and a hot taste. Its specific gravity is 0.818. It is soluble in alcohol in all proportions, and also in ether and in volatile oils, but in water only to a very small extent. When oxidized with chromic acid it yields valerianic acid. It is poisonous when inhaled or taken internally. The irritating qualities of fusel-oil are discernible even if it be present only to the extent of one-tenth per cent. in alcohol.

Alcohol Methylicum.

METHYLIC ALCOHOL.

Spiritus Pyroxylicus, Holzgeist, Methylalcohol, G.; *Alcool methylique, Alcool formique, Alcool de bois, Esprit de bois, Esprit pyroligneux,* F.; *Alcohol metylico,* Sp.; *Träalkohol, Methylalkohol,* Sw.; *Wood Alcohol, Wood Spirit, "Alcoholine," Pyroligneous Spirit, Pyroxylic Spirit, Wood Naphtha.*

Preparation.—Methylic alcohol or wood alcohol is contained in the distillate from the dry distillation of wood, together with acetic acid, etc. It is separated by neutralizing the acetic acid with lime, and redistilling, and afterward the product is purified by a series of manipulations.

Description.—A light, clear, colorless liquid, of a strong odor, reminding of alcohol and acetic ether, but having at the same time a peculiar burnt-wood odor. Its specific gravity is 0.798 at 20° C. (68°

F.). It mixes clear in all proportions with water, alcohol, and ether, and dissolves fixed and volatile oils, several resins, etc.

Uses.—In the arts and manufactures wood alcohol is frequently substituted for the ordinary (or ethylic) alcohol as a solvent, etc. In manufacturing chemistry and pharmacy it is rarely used, and only as a solvent in cases where it can be afterward entirely eliminated, and will not in any way contaminate the product.

Methylic alcohol itself is rather offensive, and causes headache, dizziness, and nausea, and hence it is never used as a constituent of any medicinal preparation. Its presence is, moreover, so readily detected by odor and taste that it could not be used as an adulteration of alcohol without detection. It was formerly used as an ingredient in preparations intended for the relief of phthisis, chronic catarrh, etc. A "Compound Elixir of Tar" is used in the District of Columbia, which contains about five per cent. rectified wood naphtha.

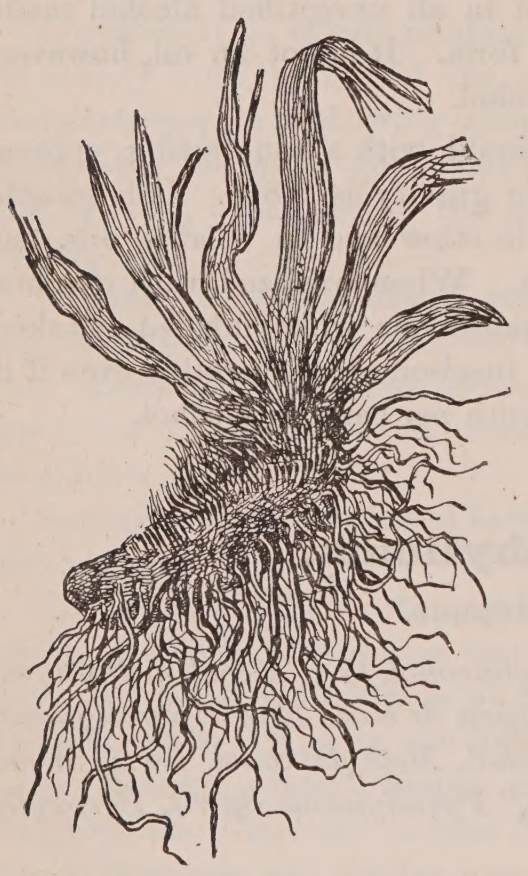


FIG. 13.—Aletris, natural size.

Aletris.

ALETRIS.

Aletridis Radix—Unicorn Root, Colic Root, Starwort Root, Stargrass Root, Blazing Star Root.

Origin.—*Aletris farinosa*, Linné (*Hæmodoraceæ*).

Habitat.—The United States.

Part used.—The rhizome.

Description.—About twenty-five to thirty-five millimeters (1 to 1½ inch) long, and three to ten millimeters (⅛ to ⅜ inch) thick, jointed, externally grayish brown, internally white and mealy, inodorous; taste bitter. Remnants of leaves are seen above and rootlets attached below. The rootlets are fifty to seventy-five millimeters (2 to 3 inches) long, the older ones being dark and tough, the younger light colored and softer. Contains a bitter principle which is soluble in alcohol.

Helonias is also called "unicorn root" and frequently sold under that name.

Uses.—Bitter tonic and stomachic. Employed in flatulent colic,

dyspepsia, etc. It is claimed to be a valuable stimulant and tonic to the uterus, counteracting a tendency to miscarriage.

Dose of the powder, 0.3 to one gram (5 to 15 grains). Average dose about 0.6 gram (10 grains), best given in the form of fluid extract.

ALETRIDIS EXTRACTUM FLUIDUM.

Fluid Extract of Aletris.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-third grains; and each fluidrachm nearly fifty-seven grains.

Dose.—One to 2.5 cubic centimeters (15 to 40 minims).

Alkanna.

Alkanet Root.

Anchusæ Radix—Alkannawurzel, G.; *Orcanette,* F.; *Ancusa de tintes orcaneta,* Sp.; *Alkannarot,* Sw.

Origin.—*Alkanna tinctoria,* Tausch (*Boraginaceæ*).

Habitat.—Collected in large quantities in Hungary. Indigenous to Asia and parts of Europe.

Part used.—The thicker upper portion of the root with the underground stem.

Description.—It is about thirty centimeters (1 foot) or less long in

its entire state, but as found in trade is considerably broken up ; finger thick ; underground stem frequently beset with remnants of the hairy leaf stalks. The outer and middle barks, in thin layers, envelop the root loosely, but the inner bark adheres firmly to the wood. The barks are purple.

Alkanet root which has been deprived of its thin foliaceous bark is worthless.

Constituents.—Contains a rich purplish-red coloring matter called *alkanet red* (*alkannin*) or *anchusin*, which is found principally in the inner cell-layers of the middle bark and the outer cells of the inner bark. It is insoluble in water, but soluble in alcohol and volatile oils, and still more soluble in ether and in fixed oils. When isolated the anchusin is a reddish-brown, resinous mass. With alkalies and alkaline earths it forms blue compounds.

The root is used in pharmacy simply to color cerates, pomades, and fixed oils, which is done by heating them moderately with the alkanet root and then straining. The color produced is quite handsome, but fades on exposure to light.

ALKANNÆ OLEUM.

ALKANET OIL.

Digest two hundred and fifty grams (8 ounces 358 grains) alkanet root (whole) during five days with one liter (34 fluidounces) olive oil (or cotton-seed oil), shaking occasionally. Strain.

Used for coloring hair oils, pomades, cerates, etc., purplish red.

ALKANNÆ TINCTURA.

TINCTURE OF ALKANET.

Digest two hundred and fifty grams (8 ounces 358 grains) alkanet root with one liter (34 fluidounces) alcohol during five days, shaking occasionally.

Used to color alcoholic liquids purplish red.

Allium; U. S.

GARLIC.

Allii Bulbus—Knoblauch, G.; *Ail*, F.; *Ajo*, Sp.; *Hvitlök*, Sw.

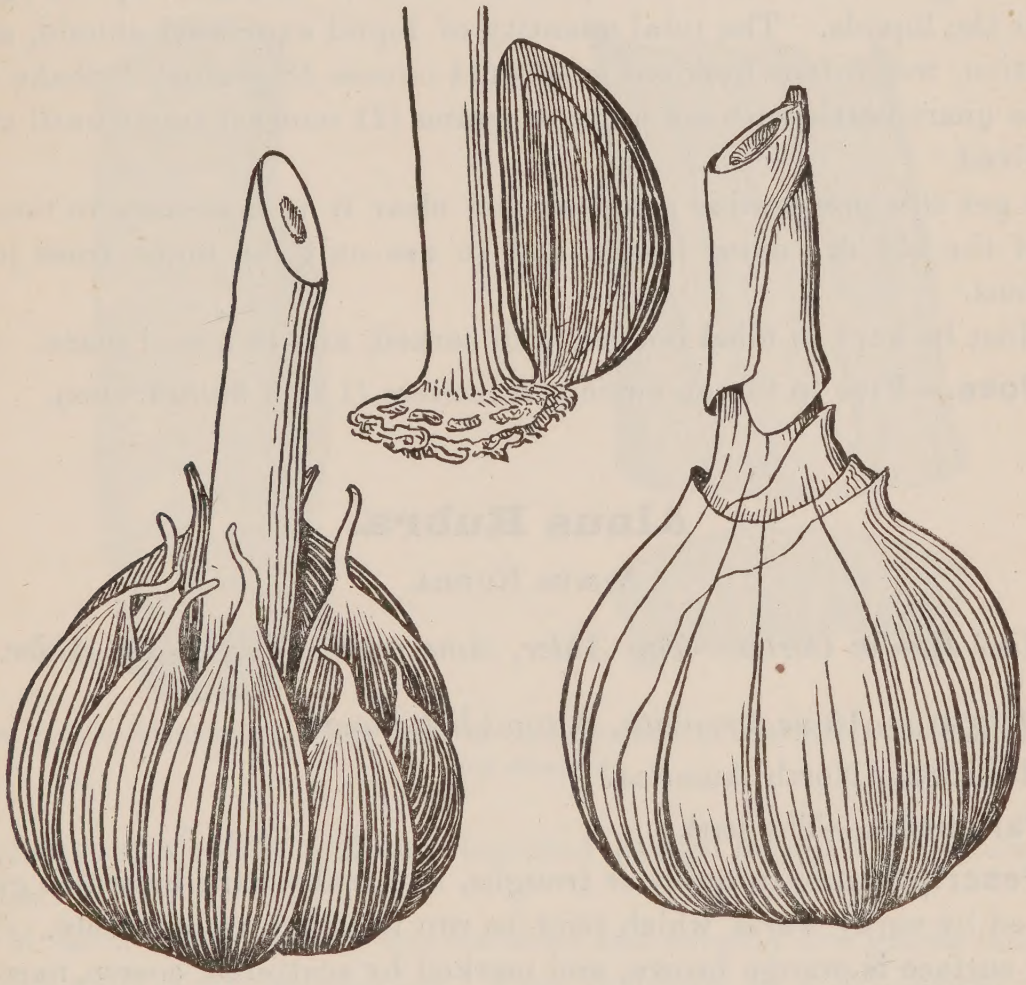
Origin.—*Allium sativum*, Linné (*Liliaceæ*).

Habitat.—Cultivated.

Part used.—The bulb.

Description.—See the Pharmacopœia, page 27. Only sound, fresh, pungent bulbs should be used. Figs. 14–16 well show the structure of garlic.

Preservation.—Must not be kept in tightly closed receptacles, as it will then soon spoil, become mouldy, and smell badly. It is best kept in dry sand, in a dry, cool place.



FIGS. 14–16.—Garlic, with and without scales, and showing insertion of "cloves" on stalk; all natural size.

Constituents.—The most important constituent of garlic is a volatile oil, which is brownish yellow, has an extremely pungent odor, and blisters the skin. It is heavier than water, and contains sulphur.

Properties and Uses.—Garlic is a stimulant carminative and increases the appetite. It causes the expulsion of flatus.

Dose.—About two grams (30 grains), best in the form of syrup.

ALLII SYRUPUS; U. S.

Syrup of Garlic.

Macerate one hundred and fifty grams (5 ounces 127 grains) sliced and bruised fresh garlic with two hundred and fifty grams (8 ounces 358 grains, measuring about 8⅓ fluidounces) diluted acetic acid in a quart bottle for four days. Express the liquid, mix the residue with an additional quantity of one hundred and fifty grams (5 ounces 127 grains, measuring about 5 fluidounces) diluted acetic acid, and express again. Filter the liquids. The total quantity of liquid expressed should, after filtration, weigh four hundred grams (14 ounces 48 grains). Shake this in the quart bottle with six hundred grams (21 ounces) sugar until all is dissolved.

To get this preparation colorless and clear it is necessary to remove all of the old dry outer leaves, and to use only the inner, fresh juicy portions.

Must be kept in filled bottles, well corked, and in a cool place.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Alnus Rubra.

Alnus Rubra.

Alni Rubræ Cortex—Tag Alder, American Alder, Black Alder.

Origin.—*Alnus serrulata,* Aiton (*Betulaceæ*).

Habitat.—North America.

Part used.—The bark.

Description.—In quills or troughs, externally dark brownish gray, marked by corky warts which tend to run together transversely. The inner surface is orange brown, and marked by scattered, coarse, narrow, short ridges or striæ. Odor feeble; taste bitter and astringent. Its constituents are not known with any certainty except that it contains tannin.

Uses.—Astringent. Used internally in diarrhœa, hæmaturia, and as a gargle and mouth-wash in sore-throat, spongy gums, etc. Also used as an injection in leucorrhœa. It is said to be alterative and emetic, and has been given in scrofula, syphilis, and various cutaneous diseases.

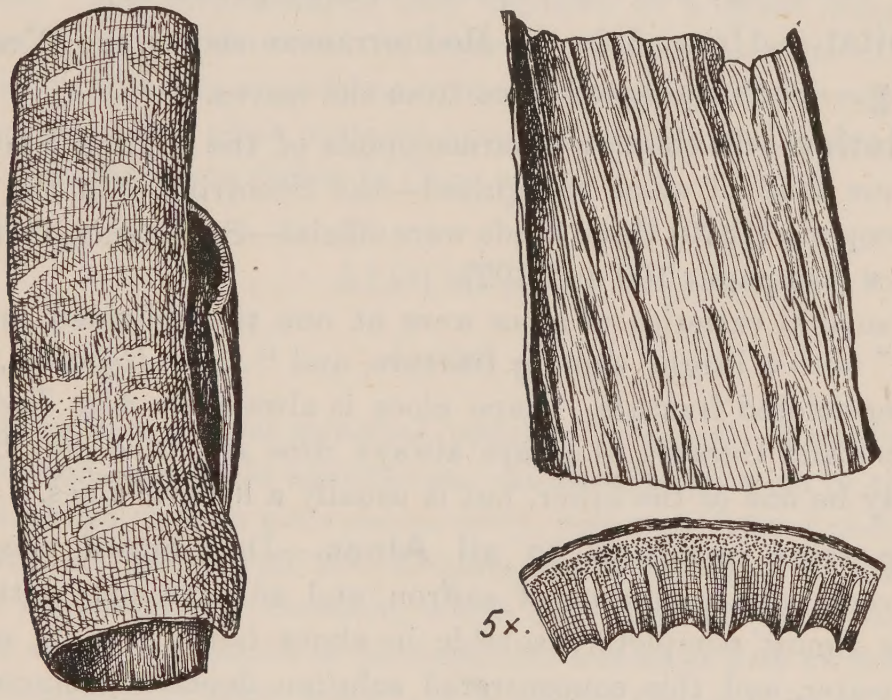
Dose.—Two to five grams (30 to 75 grains), best given in the form of fluid extract.

ALNI RUBRÆ EXTRACTUM FLUIDUM.

Fluid Extract of Tag Alder.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—17⅔ avoirdupois ounces of the drug, in No. 30 powder.

As a *menstruum* use a mixture of two hundred grams (about 8⅓



Figs. 17–19.—Alnus rubra, whole, outer and inner surface, natural size; and transverse section enlarged.

fluidounces) alcohol, and one hundred grams (about 3⅓ fluidounces) water.

Moisten the drug with one hundred and seventy-five grams (about 7 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hun-

dred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Dose.—0.50 to 2.50 cubic centimeters (8 to 40 minims).

Aloe.

Aloe, G. and Sw.; *Aloès*, F.; *Acibar*, Sp.—*Aloes.*

Origin.—*Aloe socotrina*, Lamarck; *A. vulgaris*, Lamarck; *A. spicata*, Thunberg; and other species of *Aloe* (*Liliaceæ*).

Habitat.—Africa, Asia, the Mediterranean shores, the West Indies.

Drug.—The inspissated juice from the leaves.

Varieties.—In the new Pharmacopœia of the United States there is but one kind of aloes recognized—the Socotrine. In the previous Pharmacopœia (1870) three kinds were official—SOCOTRINE, BARBADOES, and CAPE (see pages 100 and 107).

The several varieties of aloes were at one time divided into "*Aloe Lucida*," with a bright shining fracture, and "*Aloe Hepatica*," with a dull, liver-colored fracture. Cape aloes is always an *Aloe Lucida*, and Barbadoes and Curaçoa aloes are always *Aloe Hepatica*, but Socotrine aloes may be one or the other, but is usually a hepatic aloes.

Properties common to all Aloes.—Dark-brown masses having a strong odor reminding of saffron, and an extremely bitter taste. Aloes is almost completely soluble in about four times its weight of boiling water, and this concentrated solution deposits resinous matter on cooling or when diluted with water, but is not precipitated by the addition of alcohol. Diluted alcohol dissolves aloes almost entirely, taking up fully one-half its own weight, and the solution is permanent. Cold water dissolves more or less of the aloes, according to its quality. The portion dissolved by cold water was formerly called "Aloe-Bitter," while the remainder constituted the "Aloe-Resin." The *aloe-resin* being soluble in a very concentrated aqueous solution of *aloe-bitter*, but not soluble in such a solution when less concentrated, explains why a solution of one part aloes in four parts water precipitates when more water is added.

Preparation.—The value of aloes depends upon soundness and freedom from foreign substances. Carelessness in making it causes fermentation, resulting in a sourish, disagreeable odor in the finished drug, or the aloes may have more or less dirt mixed with it. The inspissation of the juice may also be carried out in various ways, a continued exposure to high heat being the cause of the absence of crystallized

aloin in some kinds (as Cape Aloes). If the mode of preparing the drug were the same in all places where it is produced, the differences between Socotrine, Barbadoes, and Cape aloes might, perhaps be less marked.

Constituents.—"Aloe-Bitter," or that portion of aloes which is soluble in cold water, is the valuable portion, while the "Aloe-Resin" is almost inert. Alkalies dissolve the resin, which is re-precipitated by the addition of acid.

All aloes contain *Aloin*. Long boiling in water renders the aloin amorphous. This circumstance may account, in a great measure, for the differences noted between the several principal varieties of aloes as to their aloin, which is sometimes crystalline and sometimes amorphous. Thus good Socotrine aloes contains numerous crystals of aloin, while no crystalline particles are visible in Cape aloes.

ALOINUM.

Aloin.

True aloin is a neutral principal peculiar to aloes. Sometimes it is crystalline, and sometimes amorphous. As usually met with in the trade and in the shops, it is an amorphous, dirty, yellowish-brown powder. T. & H. Smith, of Edinburgh and London, the discoverers of aloin, prepare pure Barbaloin and Socaloin, which have a clean yellow color and crystalline structure. Aloin is odorless, and has an at first sweetish, but afterward extremely bitter, taste. It is almost insoluble in cold water, but readily soluble in boiling water and in alcohol. Crystalline aloin is changed into the amorphous variety by long boiling in water. Alkalies and alkaline salts, when present, hasten this alteration, while acids prevent it.

Socaloin—the aloin from Socotrine aloes—crystallizes in needles. It is of a dark lemon-yellow color, and is soluble in thirty parts alcohol and in ninety parts water. Nitric acid has no effect upon it.

Barbaloin—aloin from Barbadoes aloes—is much darker than socaloin, being of an orange-yellow color, and crystallizes in prismatic needles. It dissolves readily in warm, but not as readily in cold, water or alcohol as socaloin. With a drop of nitric acid it turns crimson. By the action of nitric acid upon it chrysammic acid is one of the products formed. Barbaloin is the "Aloin" of the market.

Nataloin—from Natal (an inferior kind of African hepatic) aloes—is very light yellow, and crystallizes in scales. It turns crimson with nitric acid, but yields no chrysammic acid with it.

Aloe; U. S.

ALOES.

Socotrine Aloes.

From *Aloe Socotrina*, Lamarck.

Socotrine aloes comes from Eastern Africa, and from Socotora and other islands of the Indian Ocean.

Description.—In masses it is apparently amorphous, with a resinous fracture, opaque, sometimes soft in the interior, and of an orange-brown or yellowish-brown color. When mixed with alcohol and examined under the microscope, Socotrine aloes is seen to contain numerous crystals of aloin. In thin splinters the best aloes is translucent with a brownish-red or garnet-red color. The powder is yellowish brown. The saffron odor of aloes is in the Socotrine variety modified by a peculiar, rather pleasant odor of its own. The odor is most distinct when the drug is exposed to warm moisture, as when breathed upon.

Tests.—Good Socotrine aloes is almost entirely free from foreign (mechanical) impurities, has a pleasant odor and a reddish tinge in thin fragments. It should not be liver-colored, nor exhibit a greenish hue.

Socotrine aloes brings nearly twice the price of Barbadoes aloes, and about three times the price of Cape aloes. It is put up in boxes and kegs of sixty to one hundred and fifty pounds. (Tare inv. or actual.)

ALOE PURIFICATA; U. S.

PURIFIED ALOES.

Heat three hundred grams (or 10 avoirdupois ounces) of Socotrine aloes in a dish on a water-bath until melted. Then add forty-five grams (or $1\frac{1}{2}$ avoirdupois ounce, equal to $1\frac{3}{4}$ U. S. fluidounce) of alcohol; stir until thoroughly mixed; strain through a No. 60 sieve, which has been just before dipped into boiling water. Evaporate the strained mixture by water-bath heat, stirring constantly, until a small quantity, taken out and allowed to cool, is found to be brittle. Then, when cold, break it into pieces and put it into dry, warm bottles, which must be at once well corked.

The preparation has a dull brown color and the odor of Socotrine aloes. It is almost completely soluble in alcohol.

The object of subjecting the aloes to this straining process is, as the name implies, a purification from mechanical impurities such as the sieve will remove. The process is the same as in the Pharmacopœia of 1870.

Powdered aloes for dispensing ought always to be made from the

purified aloes. The use of purified aloes is also properly prescribed by the present Pharmacopœia in making all the official preparations of aloes except the extract, which is of course prepared from the crude aloes.

Medicinal Uses.—Aloes is used in small doses as a tonic stomachic and is an ingredient of many of the popular *bitters*. In medium doses it is laxative without increasing the fluidity of the stools, while in large doses it is actively purgative. The effect takes place about twelve hours after taking, and is increased by combining with soap or alkalies.

Aloes stimulates the function of the liver and increases the flow of bile, and is therefore of use in many cases of simple jaundice. It also stimulates the peristaltic action of the bowels, especially of the large intestine, and is therefore a valuable remedy in chronic constipation due to atony of the intestines. It is best combined with iron and belladonna, as in the formula for pills given below.

Aloes causes a determination of blood to the pelvic organs, and is much employed in *amenorrhœa*. As this condition often depends on *anæmia*, the latter trouble must also receive attention. This drug is much used in *hypochondriasis*, *biliousness*, etc.

Contrary to expectation based on a knowledge of its effect in causing hyperæmia of pelvic organs, this drug is a valuable remedy in hemorrhoids due to an atonic condition of the parts following parturition. It is given with iron, cinchona, bitter tonics, etc., or in some cases with hyoscyamus or opium.

Dose.—As a tonic, 0.05 to 0.12 gram (1 to 2 grains); as a laxative or purgative, 0.2 to one gram (3 to 15 grains).

ALOES DECOCTUM COMPOSITUM.

Compound Decoction of Aloes.

Baume de Vie.

Take four grams (60 grains) aqueous extract of aloes and three grams (45 grains) myrrh, reduce them to coarse powder and put them, together with two grams (30 grains) potassium carbonate and twenty grams (300 grains) extract of liquorice into a suitable vessel, add two hundred and fifty cubic centimeters (about 8 fluidounces) of water, cover the vessel, boil the contents gently for five minutes, then add three grams (45 grains) Spanish saffron. Let the decoction cool, then add one hundred and twenty cubic centimeters (4 fluidounces) compound tincture of cardamom; cover the vessel closely and set it aside for two hours. Finally, strain through flannel, adding enough water through the strainer to

make the total product measure four hundred and eighty cubic centimeters (16 fluidounces).

Contains 0.33 gram (5 grains) in forty cubic centimeters (1⅓ fluidounce); eight cubic centimeters (about 2 fluidrachms) of the preparation contains 0.066 gram (about 1 grain) of aloes.

It is a mild cathartic, tonic, and antacid. In England it is by many considered one of the most valuable preparations of aloes. It is not drastic in its effects, does not gripe, and is, moreover, palatable as made by the above formula, which differs from the British Pharmacopœia by an increase of the quantity of extract of liquorice added, in accordance with the recommendation of Peter Squire.

Dose.—Fifteen to sixty cubic centimeters (½ to 2 fluidounces).

ALOES ENEMA; B. P.

Enema of Aloes.

Dissolve 2.65 grams (40 grains) aloes and one gram (15 grains) potassium carbonate in three hundred cubic centimeters (10 fluidounces) decoction (mucilage) of starch. These quantities are intended for one enema.

Uses.—Purgative. Also removes threadworms (Ascaris vermicularis) from the rectum; for this purpose one hundred to one hundred and twenty cubic centimeters (3 to 4 fluidounces) should be injected at a time and retained for a while.

ALOES EXTRACTUM AQUOSUM; U. S.

Aqueous Extract of Aloes.

Mix five hundred grams (17⅔ avoirdupois ounces) of Socotrine aloes, in pieces, with five liters (about 10½ wine-pints) of boiling distilled water in a jar or other suitable vessel. Stir from time to time until the aloes is disintegrated and softened, after which let it rest twelve hours. Then decant the clear liquid from the sediment, strain the residue through muslin (without using force), mix the liquids, and evaporate the mixture to dryness by steam or water-bath heat.

Notes.—This preparation ought, for the sake of convenience, to be reduced to powder and kept in that form.

About one-third of the aloes remains undissolved and is to be thrown away. Boiling water being used, it is probable that a portion of the resin of the drug dissolves at first in the liquor, but, on cooling, it deposits again. It is dark brown.

Although long and extensively used, and highly valued by many, the Aqueous Extract of Aloes was not official in the Pharmacopœia of 1870. It is official in the British Pharmacopœia, which also prescribes an Aqueous Extract of Barbadoes Aloes made by the same process.

Dose.—0.03 to 0.2 gram ($\frac{1}{2}$ to 3 grains), preferably in pill form.

ALOES EXTRACTUM LIQUIDUM.

Liquid Extract of Aloes.

Sold sometimes in the United States as "Fluid Extract of Aloes."

Dissolve five hundred grams (or $17\frac{2}{3}$ avoirdupois ounces) of Socotrine aloes in coarse powder in one liter (or 34 fluidounces) diluted alcohol by the aid of moderate heat. Strain. Evaporate the strained liquid until it measures one liter (34 fluid ounces). Nearly the whole of the aloes dissolves.

As one liter (or 34 fluidounces) of the liquid cannot hold in solution one kilogram ($35\frac{1}{3}$ avoirdupois ounces) of aloes, a "Fluid Extract of Aloes" of the same relative strength as other fluid extracts is of course an impossibility. The preparation quoted on the price-lists of manufacturers as "Fluid Extract of Aloes" is, at least in several if not in all instances, the half-strength preparation obtained according to the above formula, which ought to be called Liquid Extract of Aloes to distinguish it from what it cannot be, except in name.

Dose.—0.30 to one cubic centimeter (5 to 15 minims).

ALOES PILULÆ; U. S.

Pills of Aloes.

Make a pill mass of one hundred and thirty centigrams (20 grains) purified aloes, in fine powder, and one hundred and thirty centigrams (20 grains) powdered soap, with a little water, and divide it into ten (10) pills. Each pill contains thirteen centigrams (2 grains) of aloes.

ALOES ET ASAFŒTIDÆ PILULÆ; U. S.

Pills of Aloes and Asafetida.

Make a pill mass of two hundred and sixty centigrams (40 grains) purified aloes, two hundred and sixty centigrams asafetida, and two hundred and sixty centigrams soap—all in fine powder—using a little water to form the mass. Divide this mass into thirty (30) pills. Each pill contains 8.66 centigrams ($1\frac{1}{3}$ grain) each of aloes and asafetida.

Dose.—Two to five pills.

ALOES ET FERRI PILULÆ; U. S.

Pills of Aloes and Iron.

Make a pill mass of sixty-five centigrams (10 grains) purified aloes, in fine powder, sixty-five centigrams dried sulphate of iron, sixty-five centigrams aromatic powder, and a sufficient quantity of confection of rose, and divide this mass into ten (10) pills. Each pill contains 6.5 centigrams (1 grain) each of aloes and dried sulphate of iron.

Dose.—Two to four pills.

ALOES ET MASTICHES PILULÆ; U. S.

Pills of Aloes and Mastic.

Lady Webster's Dinner Pills.

Make a pill mass of one hundred and thirty centigrams (20 grains) purified aloes, 32.5 centigrams (5 grains) mastic, and 32.5 centigrams (5 grains) red rose, all in fine powder, using a little water to form the mass, and divide it into ten (10) pills. Each pill contains thirteen centigrams (2 grains) aloes.

Dose.—One to two pills.

ALOES ET MYRRHÆ PILULÆ; U. S.

Pills of Aloes and Myrrh.

Rufus's Pills.

Make a pill mass of one hundred and thirty centigrams (20 grains) purified aloes and sixty-five centigrams (10 grains) myrrh, both in fine powder, 32.5 centigrams (5 grains) aromatic powder, and a sufficient quantity of simple syrup to form the mass, and divide it into ten (10) pills. Each pill contains thirteen centigrams (2 grains) aloes and 6.5 centigrams (1 grain) myrrh.

Dose.—From three to six pills.

In the British and several other Pharmacopœias saffron is used instead of aromatic powder. Thus the *Pilulæ Aloes Crocatæ* of the Swedish Pharmacopœia are made as follows: Mix twenty-five centigrams (4 grains) myrrh, twenty-five centigrams saffron, fifty centigrams (8 grains) aloes, and enough simple syrup to form the mass. Divide this into ten (10) pills. Each pill contains 2.5 centigrams (about $\frac{8}{10}$ grain) aloes.

Dose.—From three to twelve pills.

ALOES ET FERRI PILULÆ CUM BELLADONNA.

PILLS OF ALOES, IRON, AND BELLADONNA.

Mix two grams (30 grains) aqueous extract of aloes, two grams (30 grains) dried sulphate of iron, and fifty centigrams (8 grains) extract of belladonna, using a little confection of rose, if necessary, to form the mass, and divide it into thirty (30) pills.

Dose.—One pill morning and evening; the frequency of this dose to be decreased as the natural tone of the bowels is restored.

Used for chronic constipation.

ALOES ET CANELLÆ PULVIS.

POWDER OF ALOES AND CANELLA.

Hiera Picra.

Mix intimately four hundred grams (14 ounces 48 grains) powdered socotrine aloes and one hundred grams (3 ounces 230 grains) powdered canella alba.

Dose.—One to 1.50 gram (15 to 22 grains).

ALOES TINCTURA; U. S.

TINCTURE OF ALOES.

Mix fifty grams (1 ounce 334 grains) purified aloes and fifty grams extract of glycyrrhiza (black liquorice), both in moderately fine powder, with four hundred grams (14½ fluidounces) diluted alcohol, and macerate seven days in a closed vessel. Then filter. Add enough diluted alcohol through the filter to make the whole product weigh five hundred grams (17 ounces 279 grains).

This preparation differs very considerably from the corresponding tincture of the same name in the Pharmacopœia of 1870, the new preparation being three times the strength of the old. (The preparation of 1870 contained one troyounce aloes in two pints, and the alcoholic strength of the menstruum has been more than doubled.)

The Tincture of Aloes of our Pharmacopœia is now somewhat stronger than that of the British Pharmacopœia, instead of being less than one-half its strength, as formerly. The tinctures of the German and French Pharmacopœias are twice the strength of the tincture of aloes, U. S. Pharmacopœia, 1880.

Dose of the old tincture of aloes, 1870: Laxative, four to eight

cubic centimeters (1 to 2 fluidrachms); purgative, fifteen cubic centimeters (½ fluidounce).

Dose of the present tincture of aloes, 1880: Laxative, one to three cubic centimeters (15 to 45 minims); purgative, five cubic centimeters (1¼ fluidrachm).

ALOES ET MYRRHÆ TINCTURA; U. S.

TINCTURE OF ALOES AND MYRRH.

Elixir Proprietatis Paracelsi.

Mix fifty grams (1 ounce 334 grains) purified aloes and fifty grams myrrh, both in moderately fine powder, with four hundred grams (16⅔ fluidounces) alcohol, and macerate in a bottle for seven days. Filter, adding enough alcohol through the filter to make the total product weigh five hundred grams (17 ounces 279 grains). This preparation is the same strength as that of the old Pharmacopœia.

Dose.—Five to ten cubic centimeters (1¼ to 2½ fluidrachms).

In some Pharmacopœias saffron is added, as in the case of the pills of aloes and myrrh.

ALOES TINCTURA COMPOSITA; G.

COMPOUND TINCTURE OF ALOES.

Elixir ad longam vitam; Lebenselixir, G.; *Elixir de longue vie*, F.; *Swedish Bitters.*

Mix eighteen grams (278 grains) aloes, two grams (30 grains) gentian, two grams rhubarb, two grams zedoary, two grams saffron, and two grams agaric, with three hundred grams (12½ fluidounces) alcohol and ninety grams (3 fluidounces) water; macerate seven days; express, and filter.

ALOES VINUM; U. S.

WINE OF ALOES.

Mix thirty grams (1 ounce) purified aloes, five grams (77 grains) cardamom, and five grams (77 grains) ginger; reduce all to a moderately coarse powder (No. 40), and macerate with four hundred and fifty grams (about 16 fluidounces) stronger white wine (see page 1022) for seven days, shaking occasionally. Filter, and add enough wine through the

filter to make the product weigh five hundred grams (measuring about 17½ fluidounces).

Dose.—Fifteen cubic centimeters (½ fluidounce). Same strength as in 1870.

Aloe Barbadensis.

BARBADOES ALOES.

Obtained in the West Indies from *Aloe vulgaris*, Lamarck.

Description.—It is dark liver-colored, has a dull waxy fracture, and is imported in gourds. The saffron odor is more prominent in Barbadoes aloes than in any other. It is believed by some to be stronger than Socotrine aloes, two grains of the Barbadoes being considered equal to three grains of the Socotrine aloes. Water dissolves about seventy-five per cent. of its weight.

Curaçoa aloes and *Bonaire* aloes are varieties of Barbadoes aloes, and answer the description given above. Curaçoa aloes is very clean.

Dose.—0.05 to 0.10 gram (¾ to 1½ grain) as a tonic laxative; 0.2 to 0.6 gram (3 to 10 grains) as a purgative.

Barbadoes, Curaçoa, and Bonaire aloes fetch about the same prices. They are worth nearly twice as much as Cape aloes, but not much more than half the price of Socotrine aloes. Ordinary Barbadoes aloes is put up in boxes and casks of fifty pounds to three hundred pounds; the other varieties in boxes of fifty to one hundred pounds.

In the British Pharmacopœia there are a few preparations of Barbadoes aloes corresponding to those of Socotrine aloes.

Aloe Capensis.

CAPE ALOES.

Aloe Lucida.—*Capaloe*, G.

Origin.—*Aloes spicata*, Thunberg, and other species of Aloe.

Description.—This is more brittle and has a more shining fracture than the other varieties of aloes. In thin pieces it is quite transparent and clear. The color is olive (or *greenish*) brown, and the pieces are frequently covered with a film of greenish yellow powder. In bulk the powder is almost lemon yellow with a greenish cast. Cape aloes has a less prominent saffron odor than the Barbadoes or the Socotrine aloes. Sometimes the odor is disagreeably sourish (in poor grades). Under the microscope there are no crystals visible in Cape aloes. Cold water dissolves about sixty per cent., leaving a soft resinous mass together with the impurities.

Uses.—The same as of the other two varieties.

Dose.—0.05 to 0.15 gram ($\frac{3}{4}$ to $2\frac{1}{4}$ grains) as a tonic laxative; 0.2 to 0.65 gram (3 to 10 grains) as a purgative.

Value.—Cape aloes is cheaper than either Barbadoes or Socotrine aloes. It is worth only half as much as Barbadoes, and only about one-third the price of the best Socotrine.

It is *sold* in original cases of two hundred to five hundred pounds. (Tare 18 per cent.)

Preparations.—In countries where this variety of aloes is official, similar preparations are made of it as have been described under aloe (Socotrina). The preparations of Cape aloes have the greenish tint of that drug, and lack the saffron odor of the other two kinds.

FIG. 20.—Alstonia constricta, natural size.

Alstonia Constricta.

ALSTONIA CONSTRICTA.

Australian Fever Bark.

Origin.—*Alstonia constricta*, F. Mueller (*Apocynaceæ*).

Habitat.—Australia.

Part used.—The bark.

Description.—Quills or troughs of various lengths from ten to sixty centimeters (a few inches to 2 feet), from twelve to sixty millimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ inches) thick, covered externally by a rough, fissured, corky layer, which is grayish brown, spongy, friable, and in cross section mottled, yellow, and brownish. The inner bark is about six millimeters ($\frac{1}{4}$ inch) thick, firm, fibrous, tough, with longitudinal ridges on the inner surface, yellowish in cross section.

Constituents.—The drug appears to contain an alkaloid, *alstonine*, which is very bitter.

Medicinal Uses.—This drug is a bitter tonic and antiperiodic, and has been found useful in all cases in which cinchona barks are generally employed. It is not as reliable in its action, however, and seems to be already falling into disuse again, although introduced only a few years ago.

Dose.—Five to fifteen grams (1 to 4 drachms), best given in fluid extract.

ALSTONIÆ CONSTRICTÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ALSTONIA CONSTRICTA.

To make five hundred cubic centimeters (or 17 fluidounces):

Use five hundred grams (17⅔ ounces) of Alstonia constricta in No. 60 powder, and alcohol as a menstruum. Moisten with one hundred and fifty grams (6¼ fluidounces). Pack tightly in a cylindrical percolator. Saturate with more menstruum. Macerate forty-eight hours. Percolate. Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted. Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough alcohol to make the whole product measure five hundred cubic centimeters (17 fluidounces). For details, see p. 451.

Each cubic centimeter represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains; and each fluidrachm nearly fifty-seven grains.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

FIG. 21.—Althæa root, natural size; large specimen.

Althæa; U. S.

ALTHÆA.

Althææ Radix—Eibischwurzel, Altheewurzel, G.; *Racine de Guimauve*, F.; *Altea, Malvabisco*, Sp.; *Altearot*, Sw.; *Marshmallow Root.*

Origin.—*Althæa officinalis*, Linné (*Malvaceæ*).

Habitat.—Cultivated in Europe.

Part used.—Peeled root.

Description.—See the Pharmacopœia, page 28. It has no pith. Must be *white* and *dry*. A discolored or mouldy root, or one having a disagreeable or sourish odor or taste, must be rejected.

FIG. 22.—Transverse section of Althæa root, slightly enlarged.

Constituents.—Althæa root is rich in *mucilage* and starch, containing about thirty-five per cent. of each. It also contains two per cent. of *asparagin*, eleven per cent. pectous matter, ten per cent. sugar, and one per cent. fixed oil. There is no tannin in it.

Uses.—Of the mucilaginous drugs althæa root must be considered as one of the foremost. It has no active medicinal properties, but is unquestionably one of the best demulcents. It is very generally used in pectoral teas and syrups, especially in Europe.

Powdered althæa root, with a sufficient quantity of hot water to give it the right consistence, makes a good emollient poultice.

The powdered drug is also much used as an excipient in pill masses and troches, and is for that purpose to be greatly preferred to powdered liquorice root.

ALTHÆÆ DECOCTUM.

Decoction of Althæa.

Make five hundred grams (about 17 fluidounces) of decoction from fifty grams (1 ounce 334 grains) of cut althæa root. For details, see page 401.

Dose.—Use freely as a demulcent drink. It is also used as an injection.

ALTHÆÆ RADICIS EXTRACTUM FLUIDUM.

Fluid Extract of Althæa Root.

A Fluid Extract of Marshmallow Root is on several of the manufacturers' lists. From the nature of the drug such a preparation is quite improper and useless. We have seen some specimens of this fluid extract, all of them dark colored, and we have also seen syrup of althæa made from the fluid extract. When so made the syrup is dark colored, unsightly, and altogether a very different thing from a proper syrup of althæa, which is always to be made as follows:

ALTHÆÆ SYRUPUS; U. S.

Syrup of Althæa.

Put thirty grams (1 ounce) cut althæa into a sixteen-ounce wide-mouthed bottle, pour about two hundred and forty cubic centimeters (8 fluidounces) cold water on it, shake, and then pour the water away. The object is to remove dust. Now put four hundred and fifty cubic centimeters (15¼ fluidounces) water on the washed althæa and macerate one hour, stirring frequently, but not so actively as to cause the separation of solid particles from the drug. Then strain through flannel without

using any force. In three hundred cubic centimeters (10 fluidounces) of this strained infusion, dissolve by shaking, and without heat, four hundred and seventy grams (16 avoirdupois ounces) sugar.

The Pharmacopœia directs that this preparation be freshly made whenever wanted for use.

To get the preparation perfectly clear the infusion ought to be filtered. If hot water is used, the starch will enter into the preparation, and not only render it thick and unclear, but the product will then not keep nearly so well; and if expression is resorted to, the infusion will also be unclear.

When properly made, from good white althæa, the preparation is pale, straw-colored, perfectly clear, and keeps quite well for several weeks if put in a cool place. In the Swedish Pharmacopœia the preparation is flavored with orange-flower water, which makes it very pleasant. Without flavoring of any kind it is insipid.

ALTHÆÆ PULVIS COMPOSITUS.

Compound Powder of Althæa.

Pulvis Gummosus, Sw.

Mix thirty grams (1 ounce) powdered althæa, sixty grams (2 ounces) powdered acacia, and sixty grams (2 ounces) powdered sugar.

Used as a vehicle for more active remedies.

Thus the "*Pulvis Gummosus Stibiatus*" of the Swedish Pharmacopœia consists of one gram (15 grains) kermes mineral, nine grams (138 grains) sugar, and thirty grams (1 ounce 25 grains) of the compound powder of althæa (or pulvis gummosus).

ALTHÆÆ SPECIES COMPOSITÆ.

German Breast Tea.

Species Pectorales, G. P.—*Brust Thee.*

Mix eighty grams (2 ounces 359 grains) cut althæa root, thirty grams (1 ounce 25 grains) peeled and cut glycyrrhiza, ten grams (154 grains) cut or crushed orris root, forty grams (1 ounce 180 grains) cut tussilago (colt's-foot herb), twenty grams (308 grains) mullein flowers, and twenty grams (308 grains) bruised star anise.

A popular demulcent drink as tea in bronchial affections, coughs, colds, etc.

Althææ Flores.

ALTHÆA FLOWERS.

Marshmallow Flowers.

About fifteen millimeters ($\frac{2}{3}$ inch) long, tubular, greenish-yellow. They have a nine-cleft involucel, five sepals, and five pale rose-colored petals, which are heart-shaped with the point at the base. Mucilaginous.

ALTHÆÆ FLORUM EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ALTHÆA FLOWERS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred and twenty-five grams (about 8$\frac{1}{2}$ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13$\frac{1}{2}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains ; and each fluidrachm nearly fifty-seven grains.

Dose.—Five to ten cubic centimeters (1 to 2$\frac{1}{2}$ fluidrachms).

Aluminium.

ALUMINIUM.

Common clay is a silicate of aluminium. Alum is a sulphate of aluminium and potassium, and the metal was named after it.

The metal is white as tin, is malleable, may be filed, and can be drawn into fine wire. Does not oxidize in air either at the ordinary temperatures or in fire. It is not attacked by dilute acids except hydrochloric acid. When heated with solution of potassa or soda it dissolves, hydrogen being given off and aluminates formed.

Aluminium is one of the hardest of metals. Its specific gravity is 2.56.

Weights made of aluminium foil and wire are very convenient, and may be obtained of great accuracy. Owing to the lightness of the metal they are considerably larger than weights made of platinum, silver, or brass, and are thus less liable to get lost; and their great hardness, as well as the fact that this metal does not oxidize or tarnish, makes them exceptionally durable. They can be easily cleaned with dilute sulphuric acid.

The salts of aluminium are colorless, and those that are soluble in water (chloride, sulphate) have a sweetish, acidulous, astringent taste, and acid reaction.

"*Rotten Stone*" is a soft, finely divided, friable clay of a dark brownish-gray color. It is used to polish steel instruments, etc.

Alumen; U. S.

ALUM.

Aluminio-Potassicus Sulphas; Aluminio-Potassic Sulphate—Aluminii et Potassii Sulphas; Sulphate of Aluminium and Potassium—Alaun, Kalialaun, G.; *Alun, Sulfate d'alumine et de potasse*, F.; *Alumbre, Sulfato Aluminico-potasico*, Sp.; *Alun*, Sw.; *Potash Alum; Potassa Alum.*

Description and Tests.—See the Pharmacopœia, page 29.

Attention is invited to the fact that the *Alum* of the present Pharmacopœia is the potassa alum instead of the ammonia alum, which was the "Alum" of the Pharmacopœia of 1870. The name "Alum" properly belongs to the potassa alum, and for medicinal purposes this kind of alum is to be preferred to the sulphate of aluminium and ammonium.

Most, if not all, of the article sold under the name of *Alum* in this country is ammonia alum, and in order to obtain the true alum—potassa alum—which is now the only one officially recognized, it will be necessary in ordering it to distinctly specify *Potassa Alum.*

Alum is soluble in about ten parts of water at the ordinary temperature. At 100° C. (212° F.) its solubility in water is unlimited as it melts in its water of crystallization alone. It is soluble in glycerin, but insoluble in alcohol, diluted alcohol, ether, chloroform, benzol, and in volatile and fixed oils.

Ammonia alum is distinguished from the official alum by the odor of ammonia developed when solution of potassa or soda is added.

Medicinal Uses.—Alum is an astringent and is used internally for the purpose of checking passive hemorrhages, diarrhœas, and fluxes.

Externally and locally it is also used as an hæmostatic in nose-bleeding, bleeding gums, leech-bites, etc. ; as an injection in bleeding from the anus or vagina ; as a gargle and mouth-wash in tender gums, relaxation of the uvula, or in pharyngitis; as an injection in leucorrhœa, etc.

Alum is also an emetic, useful in cases of poisoning ; it is given for this purpose in large doses, followed by copious draughts of warm water.

Dose.—Five to thirty grains (0.33 to 1.33 gram) in some pleasant syrup for internal use, two or three times daily.

As an emetic, one to two drachms (4 to 8 grams).

As a *gargle* or *wash*, or as an *injection* in leucorrhœa, one-half to one ounce in one pint (15 to 30 grams in 500 cubic centimeters) of water.

As a local *hæmostatic*, in saturated solution.

Alum curd may be made by rubbing white of egg with a lump of alum until it is coagulated ; this forms an excellent application in inflamed eyes or eyelids, and in recent ecchymoses.

Alum Whey.—Boil four grams (60 grains) of alum in three hundred cubic centimeters (10 fluidounces) of milk and strain. Dose, a wineglassful.

Used internally for the same purposes as alum. The caseous curd may be used for the same purposes as the albumen curd.

ALUMEN EXSICCATUM; U. S.

Dried Alum.

Alumen Ustum—*Gebrannter Alaun*, G.; *Alun calciné, desseché ou brulé*, F.; *Alumbre calcinado, Sulfato aluminico-potasico anhidro*, Sp.; *Bränndd alun*, Sw.; *Burnt Alum.*

Prepared by exposing one hundred and eighty-three ounces of alum for several days to a heat of about 80° C. (176° F.) until it has entirely effloresced ; then heating it in a porcelain dish at about 200° C. (392° F.) until it is perfectly white, light, and porous, and weighs one hundred ounces. When cold it is powdered.

Must be kept in well-closed bottles, as it is capable of absorbing a large amount of moisture if exposed to the air. It dissolves extremely slowly, but yet perfectly, in twenty-three times its weight of water at 15° C. (59° F.). At a boiling heat two ounces dissolve quickly in three ounces of water.

Medicinal Uses.—This is a powerful astringent and stimulant,

and may be escharotic when applied to forming granulations, as in *proud flesh.* It is used externally in hemorrhages from leech-bites, from the gums after drawing of teeth, etc. Also as a snuff in bleeding from the nose.

Locally it is applied to stimulate chronic ulcers, to repress fungoid granulations, in ingrown nails, etc.

Aluminii Chloridum.

CHLORIDE OF ALUMINIUM.

Aluminicum Chloridum; Aluminium Chloride—Thonerdechlorid, G.; *Chlorure d'alumine,* F.; *Cloruro aluminico,* Sp.; *Aluminium Klorid,* Sw.

Obtained pure in white crystals by dissolving the hydrate of aluminium in hydrochloric acid, and evaporating carefully. In an impure state, though sufficiently pure for disinfecting purposes, it may be obtained in solution as follows : Forty-five grams (1½ ounce) fused chloride of calcium is dissolved in two hundred and forty cubic centimeters (8 fluidounces) of water, and ninety grams (3 ounces) alum is dissolved in seven hundred and twenty cubic centimeters (24 fluidounces) hot water; the solution of chloride of calcium is added to the solution of alum, the precipitate removed by filtration, and enough water added to make the whole measure nine hundred and sixty cubic centimeters (32 fluidounces).

Solution of impure chloride of aluminium has been extensively used as a disinfectant under the name of "chlor-alum."

Aluminii Hydras; U. S.

HYDRATE OF ALUMINIUM.

Hydrated Alumina.

Dissolve three hundred and thirty grams (11 ounces) of alum in five liters (or 10 pints) of distilled water. Also dissolve three hundred grams (10 ounces) of carbonate of sodium in another five liters (10 pints) of distilled water. Heat both solutions until they boil. Then pour the solution of alum into the solution of carbonate of sodium, stirring constantly, and then add about three liters (6 pints) boiling distilled water. The solutions must be mixed in a capacious vessel, because there is a brisk evolution of carbon dioxide. After the precipitate has subsided, the clear liquid is siphoned off, or decanted, and six liters (12 pints) more of boiling distilled water is poured upon the precipitate. After the precipitate has settled, the clear liquid is again poured off

(or best drawn off with a rubber siphon), and the precipitate is transferred to a muslin strainer and washed with hot distilled water until the washings no longer give a precipitate with solution of chloride of barium (a faint cloudiness is allowed). The precipitate is left to drain thoroughly, and is then dried at not above 40° C. (104° F.) and powdered.

Description and Tests.—See the Pharmacopœia, p. 30.

It is a dry, white powder, insoluble in water or alcohol, but soluble without residue in hydrochloric acid, sulphuric acid, solution potassa, or solution of soda.

The sulphate of aluminium and the chloride may be prepared by dissolving the hydrate in the acids, respectively.

Hydrate of aluminium is seldom used in medicine. It is a mild astringent in diarrhœas of children, etc., but is generally combined with more active remedies, as opium, powdered mace, etc.

Dose.—0.125 to 0.6 gram (2 to 10 grains).

Aluminii Sulphas; U. S.

Sulphate of Aluminium.

Description and Tests.—See the Pharmacopœia, pages 30 and 31.

Prepared by dissolving the hydrate of aluminium in diluted sulphuric acid.

A white crystalline powder, soluble in one and one-fifth part water at 15° C. (59° F.), and very soluble in boiling water, but insoluble in alcohol.

It should be dry, but, as usually seen, it is a white, more or less moist, crystalline mass.

Medicinal Uses.—This substance is seldom if ever given internally. A diluted solution is useful as a disinfectant and astringent local application in foul ulcers, leucorrhœa, etc. A concentrated solution is a powerful astringent and escharotic and has been used to destroy fungoid or polypoid growths, and to stimulate chronically inflamed tissues.

Ambra Grisea.

Ambergris.

A peculiar substance secreted in the intestines of *Physeter macrocephalus*, Linné.

Gray or brownish gray, streaky and dotted, crumbles easily when cold, and melts in hot water. Soluble in hot alcohol, and in ether and volatile oils. Has a peculiar fragrance, but no taste.

When heated on platinum foil it should not give off any acrid vapors, and only a small residue should be left.

Uses.—Similar to musk. It is supposed to act as a stimulant and antispasmodic, and has been used in the typhoid conditions of various diseases and fevers.

It is seldom used at present as a medicine, but is often employed in perfumes.

Ammoniacum; U. S.

AMMONIAC.

Ammoniacum Gummi-Resina—Ammoniak-gummi, G.; *Ammoniaque, Gomme-résine ammoniaque*, F.; *Goma amoniaco*, Sp.; *Ammoniacum*, Sw.—*Gum Ammoniac.*

Origin.—*Dorema Ammoniacum*, Don (*Umbelliferæ*).

Habitat.—Persia, Turkestan.

Part used.—The concreted gum-resin.

Description.—See the Pharmacopœia, page 31.

The Pharmacopœia requires the use of ammoniac in tears only. Must be free from dark-colored pieces, and from all foreign admixtures, bark, stems, seeds, sand, etc. The tears are light yellow, or yellowish brown externally, and freshly broken or cut they show a bluish milk-white interior. At ordinary temperatures they are hard, but soften with the warmth of the hand. Ammoniac can be powdered only with difficulty and in the cold. Triturated with water it must yield a fine, rich, milk-white emulsion. About four-fifths of the gum-resin dissolves in ninety per cent. alcohol.

Ammoniac deteriorates by age. Dark-colored gum-resin with but a faint odor must be rejected.

The most important constituents of the drug are volatile oil, resin, and gum. The volatile oil is colorless and has a very strong odor, but does not contain sulphur. The medicinal value probably depends upon this volatile oil, of which the gum-resin contains a very variable amount, from less than one-half per cent. up to as much as four per cent. having been found by various investigators. There is from sixty-eight to seventy-two per cent. resin, and from eighteen to twenty-three per cent. gum. The resin is a mixture of two kinds, one acid and the other indifferent. The latter contains sulphur.

Medicinal Uses.—Ammoniac is antispasmodic and blennorrhetic, and resembles asafetida in its action.

It is employed in chronic bronchitis, as an alterative expectorant, and

is used externally as a rubefacient in cases of rheumatism, chronic catarrh, etc.

Dose.—0.5 to two grams (8 to 30 grains).

AMMONIACI EMPLASTRUM; U. S.

Ammoniac Plaster.

Made by digesting two hundred grams (7 ounces 24 grains) ammoniacum in three hundred grams (10 ounces 255 grains) of diluted acetic acid in an earthenware, porcelain, or glass vessel, until thoroughly softened, forming a uniform, soft, pasty mixture, which is then strained and evaporated on water-bath during uninterrupted stirring with a wooden spatula until a sample taken out hardens on cooling. No iron spatula or other metallic implement must be allowed to come in contact with the plaster, as that would discolor it.

Uses.—This plaster is used as a stimulant discutient, being especially applicable for the promotion of absorption of chronic indolent tumors and swellings showing no inflammatory symptoms, as in scrofulous swellings of glands or joints.

AMMONIACI EMPLASTRUM CUM HYDRARGYRO; U. S.

Ammoniac Plaster with Mercury.

Digest seven hundred and twenty grams (26 ounces 46 grains) ammoniac in clean tears with one thousand grams (35 ounces 120 grains) diluted acetic acid in a jar until quite liquefied or emulsionized; strain the liquid and then evaporate it on a water-bath in a porcelain evaporating dish during constant stirring until a sample removed from the dish hardens on cooling.

Heat eight grams (123 grains) olive oil and add to it gradually one gram (15 grains) sublimed sulphur, stirring the mixture until all is dissolved; to this sulphurated oil add one hundred and eighty grams (6 ounces 152 grains) mercury and triturate until the metal is extinguished and no globules further visible. Now add to the mercury mixture the hot ammoniac emulsion, and a sufficient quantity of lead plaster, previously melted, to make the whole product weigh one thousand grams (35 ounces 120 grains), and mix thoroughly.

This is a great improvement on the process of the old Pharmacopœia, which directed boiling the ammoniac with water until liquefied, and then straining. Diluted acetic acid exerts a solvent action on the constituents of the gum-resin, and hence liquefies it without the use of a

high degree of temperature. During the evaporation of the emulsion, however, the greater portion of the volatile oil is liable to be expelled.

Sulphur is added simply to help extinguish the mercury, whereby some mercury sulphide is formed, which renders the plaster dark colored.

Rarely used. It is a discutient, and is sometimes prescribed as an application to syphilitic swellings.

AMMONIACI MISTURA; U. S.

AMMONIAC MIXTURE.

Triturate twelve grams (185 grains) selected clean tears of ammoniac in a stone or Wedgewood mortar with three hundred cubic centimeters (10 fluidounces) water until an emulsion is formed, and then strain.

It requires considerable and firm rubbing to reduce the whole of the ammoniac to a smooth paste, and only a small quantity of water is to be added at a time to accomplish this before the bulk of the water is put in.

Ammonium.

AMMONIUM.

A compound radical (H_4N) which in its compounds closely resembles potassium and sodium.

Ammonium salts are generally prepared from ammonia (H_3N); they are mostly colorless, and readily soluble in water. Mixed with potassa, soda, or lime, they give off ammonia gas, which is recognized by the odor, or by the white cloud formed when a glass rod moistened with hydrochloric acid is held near the mixture.

Ammoniæ Aqua; U. S.

WATER OF AMMONIA.

Ammonici Hydratis Solutio; Solution of Ammonium Hydrate.—Liquor Ammoniæ.—Ammoniacum Causticum.—Salmiakgeist, Aetzammoniak, Ammoniakflüssigkeit, G.; *Ammoniaque liquide, Eau d'ammoniaque,* F.; *Amoniaco liquido, Alcali volatil, Espiritu de sal amoniaco,* Sp.; *Ammoniak, Kaustik Ammoniak,* Sw.; *Solution of Ammonia, Spirit of Hartshorn.*

Description and Tests.—See the Pharmacopœia, page 41. A solution of ammonia in water, containing ten per cent. by weight of the gas. It has a specific gravity of 0.956 at 15° C. (59° F.), corresponding

to 16° Baumé. Should be perfectly colorless and limpid, and free from empyreuma. The latter is discovered by the odor on neutralizing the ammonia with diluted sulphuric acid, or by diluting it largely with distilled water and rubbing it in the hands.

Care is necessary in handling water of ammonia, so as not to suddenly inhale too much of the gas. It is very caustic.

AMMONIÆ AQUA FORTIOR; U. S.

Stronger Water of Ammonia.

Descripton and Tests.—See the Pharmacopœia, page 41. Contains twenty-eight per cent. by weight of ammonia gas. Specific gravity 0.900 at 15° C. (59° F.).

The Pharmacopœia directs the preservation of stronger water of ammonia in strong, glass-stoppered bottles, only partially filled, and put in a cool place. This is to prevent accidents which might prove serious. If the bottles are too full, or not strong enough, they may burst, especially if the contents are warm. Never open a bottle of water of ammonia having a tight-fitting stopper without turning your face aside in order to avoid injury to the eyesight. Ammonia is excessively pungent and acrid. Do not smell it without due caution.

So-called FFF Ammonia, sold by chemical manufacturers, is a seventeen and one-half per cent. solution, having the specific gravity 0.933, corresponding to 20° Baumé.

Ten pounds stronger water of ammonia, diluted with eighteen pounds distilled water, will make twenty-eight pounds of the official water of ammonia; and ten pounds FFF water of ammonia, diluted with seven and one-half pounds distilled water, will make seventeen and one-half pounds of the official water of ammonia.

Medicinal Uses.—Aqua ammoniæ is seldom given internally. It is sometimes used as an inhalation by holding the mouth of the bottle containing it to the nostrils of a person who has fainted. Externally it is used as a stimulating ingredient of liniment in *rheumatism*, etc. The stronger water of ammonia may also be used as a vesicant, by placing a bit of cotton saturated with it on the skin and covering with a pill-box or other small vessel to prevent the escape of the vapor. In a few minutes a blister will form.

Dose.—One to two cubic centimeters (15–30 drops) largely diluted with water.

AMMONIÆ LINIMENTUM; U. S.

AMMONIA LINIMENT.

Mix ninety grams (3 ounces) water of ammonia with two hundred and ten grams (7 ounces) cotton-seed oil.

The ammonia liniment in the Pharmacopœia of 1870 was one fluidounce water of ammonia to two troyounces olive oil.

Medicinal Uses.—This liniment is a useful stimulant and counter-irritant application in rheumatism, neuralgia, etc.

AMMONIÆ SPIRITUS; U. S.

SPIRIT OF AMMONIA.

Put eight hundred grams (28 ounces 96 grains, measuring about 31 fluidounces) of recently distilled alcohol (which has not been kept in a barrel, but in glass) into a glass receiver. Put four hundred and fifty grams (15 ounces 382 grains) stronger water of ammonia into a flask. Connect the flask and receiver in the usual way. Heat the flask carefully and gradually to not over 60° C. (140° F.), and keep the contents at that temperature about ten minutes. Now disconnect the flask from the receiver. Determine the relative quantity of ammonia by weight contained in the alcohol by ascertaining the quantity of volumetric solution of oxalic acid required to saturate it. Then dilute the liquid with alcohol to such a quantity by weight that the final product shall contain ten per cent. of ammonia.

Preservation.—Spirit of ammonia must be kept in bottles with well ground glass stoppers and in a cool place.

Description and Tests.—See the Pharmacopœia, page 305.

The use of alcohol from an oaken barrel gives a colored, unclear product.

Medicinal Uses and **Dose** similar to those of aqua ammoniæ.

Ammonii Acetatis Liquor; U. S.

SOLUTION OF ACETATE OF AMMONIUM.

Spiritus Mindereri; Spirit of Mindererus.

Add carbonate of ammonium to diluted acetic acid until the latter is perfectly neutralized, so as to no longer affect litmus paper. It must be made fresh each time it is wanted for use, because, by keeping, it loses both acetic acid and carbonic acid.

The Pharmacopœia gives an alternate process, intended to enable the pharmacist to dispense the preparation at a moment's notice, as follows :

1. Dissolve thirty grams (463 grains) of carbonate of ammonium in two hundred and forty grams (8 fluidounces) distilled water, filter the solution and keep it in a well-stopped bottle.

2. Mix eighty-four grams (1,296 grains) acetic acid (not the diluted) with one hundred and eighty-six grams (6⅕ fluidounces) distilled water, and keep this also separately in a well-closed bottle.

Whenever solution of acetate of ammonium is required, mix equal parts, *by weight*, of the two liquids.

The Pharmacopœia requires that the solution of acetate of ammonium shall be free from empyreuma, that is, free from smoky odor. This condition can never be attained except with the use of perfectly pure acetic acid and carbonate of ammonium. The odor and taste of solution of acetate of ammonium, made from the ordinary (impure) acetic acid and carbonate of ammonium is extremely offensive to sensitive persons ; whereas, on the other hand, the same preparation, when made with cold distilled water and absolutely pure materials, is not at all unpleasant. A good test for the freedom of both acetic acid and ammonium carbonate from empyreuma, is just the preparation of this solution from them. If the product has a pure saline taste, and a clean odor, the materials are good; if it has a smoky odor and taste, the materials were impure.

As much of the carbonic acid (set free from the carbonate of ammonium) ought to be retained in the solution as possible. Hence, the preparation ought to be made with *cold* water, and in a strong bottle which should be corked and shaken at intervals while the acetic acid is being neutralized, the cork being occasionally removed.

Solution of acetate of ammonium has a specific gravity of 1.022 and contains 7.6 per cent. acetate of ammonium. It should be perfectly clear.

Medicinal Uses.—This is a valuable diaphoretic, much employed in the early stages of febrile and inflammatory diseases. It is often given in expectant treatment before a positive diagnosis is made, as during the prodromic stages of scarlatina, measles, variola, etc.

As a diffusible stimulant, it is given in typhus, typhoid, and other fevers. Externally, it is occasionally, though seldom, employed as an application to bruises, contusions, and inflammatory swellings.

Dose.—Fifteen to thirty cubic centimeters (½ to 1 fluidounce) diluted with water, and rendered palatable by flavoring syrups.

Ammonii Benzoas; U. S.

BENZOATE OF AMMONIUM.

Ammonicus Benzoas; Ammonium Benzoate.

Description and Tests.—See the Pharmacopœia, page 31. Must be perfectly white, made from the true benzoic acid (from benzoin), and should have a slight odor of benzoin.

Soluble in five times its own weight of water and in twenty-eight times its weight of alcohol. Ten grams (154 grains) of the salt dissolve in fifteen grams (½ fluidounce) boiling water, and in eighty grams (3⅓ fluidounces) boiling alcohol.

If necessary, it may be extemporaneously made in solution by taking seven-eighths as much benzoic acid as the quantity of benzoate of ammonium required, and neutralizing with water of ammonia.

Medicinal Uses.—It is employed for the same purposes as benzoic acid alone, but is often preferred on account of its greater solubility.

Dose.— 0.33 to 1.33 gram (5 to 20 grains).

Ammonii Bromidum; U. S.

BROMIDE OF AMMONIUM.

Ammonicum Bromidum; Ammonium Bromide—Hydrobromate of Ammonia.

Description and Tests.—See the Pharmacopœia, pages 31 and 32. At 15° C. (59° F.) three hundred cubic centimeters (10 fluidounces) of water will dissolve two hundred grams (7 ounces 24 grains) ammonium bromide. Of alcohol it takes eleven pints to dissolve one ounce. In diluted alcohol the salt dissolves readily.

Should be kept in well-closed bottles. When exposed to the air a long time it turns yellowish.

Solution for Dispensing Purposes.—Dissolve two hundred grams (7 ounces 24 grains avoirdupois) of the bromide of ammonium in enough distilled water to make the finished solution measure four hundred cubic centimeters (13½ fluid ounces). Filter.

Each cubic centimeter of the solution contains one-half gram of the salt; one hundred and five minims contain fifty grains.

Medicinal Uses.—Used like bromide of potassium in *epilepsy, whooping-cough,* and other neuroses. It is doubtful whether it possesses any properties that render it preferable to the potassium salt, and it certainly is more disagreeable to the taste.

Dose.—0.33 to 2.0 grams (5 to 30 grains) three times daily.

Ammonii Carbonas; U.S.

CARBONATE OF AMMONIUM.

Ammonicus Carbonas; Ammonium Carbonate.—Sesquicarbonas Ammonicus; Supercarbonas Ammonicus; Ammonium Carbonicum; Sal Volatile; Sal Cornu Cervi.—Kohlensaures Ammonium, Flüchtiges Laugensalz, Hirschhornsalz, G.; *Carbonate d'ammoniaque, Alkali Volatile Concret, Sel Volatil d'Angleterre,* F.; *Carbonato Ammonico,* Sp.; *Sur Kolsyrad Ammoniumoxid, Hjorthornssalt,* Sw.; *Sesquicarbonate of Ammonia, Bicarbonate of Ammonia, Hartshorn.*

Description and Tests.—See the Pharmacopœia, page 32.

On exposure the preparation gradually loses both ammonia and carbonic acid, this loss amounting finally to from forty-three to forty-four per cent. By this change it becomes more and more opaque, and is finally converted into friable porous lumps, or white powder consisting of bicarbonate of ammonium. The Pharmacopœia accordingly directs that this preparation shall be kept in well-stopped bottles in a cool place.

Water dissolves one-fourth its weight of carbonate of ammonium at 15° C. (59° F.). Alcohol dissolves out the carbamate of ammonium only, leaving the bicarbonate of ammonium.

Must be hard and translucent and perfectly free from any discoloration and from empyreumatic (smoky) odor. When dissolved in pure diluted acetic or diluted sulphuric acid it must not give a solution that tastes or smells of empyreumatic (smoky) matters. A carbonate of ammonium which is at all impure is unfit for preparing solution of acetate of ammonium.

Medicinal Uses.—The carbonate of ammonium is a good preparation of ammonia for purposes of general stimulation in typhoid conditions.

Dose.—0.25 to 0.5 gram (4 to 8 grains) in syrup or mucilage of acacia every hour or two, if necessary. Average dose about 0.25 gram (4 grains).

AMMONII CARBONAS PYROLEOSUS.

EMPYREUMATIC HARTSHORN.

Triturate together three grams (46 grains) Dippel's animal oil, and ninety-seven grams (3 ounces 184 grains) ammonium carbonate, in powder, until thoroughly mixed.

Used to prepare liquor ammonii succinatis.

STOKES'S EXPECTORANT.

Dissolve five grams (75 grains) ammonium carbonate in ninety cubic centimeters (3 fluidounces) water ; add 7.50 cubic centimeters ($\frac{1}{4}$ fluidounce) fluid extract of squill, 7.50 cubic centimeters ($\frac{1}{4}$ fluidounce) fluid extract of senega, sixty cubic centimeters (2 fluidounces) camphorated tincture of opium, and enough syrup of tolu to make the whole mixture measure three hundred cubic centimeters (10 fluidounces).

Dose.—Five cubic centimeters (1 teaspoonful).

AMMONIÆ SPIRITUS AROMATICUS ; U. S.

Aromatic Spirit of Ammonia.

Put one hundred grams (3 ounces 230 grains) water of ammonia and one hundred and forty grams ($4\frac{3}{4}$ fluidounces) distilled water in a quart flask ; add forty grams (1 ounce 180 grains) ammonium carbonate previously reduced to a moderately fine powder. Then close the flask and shake it until the ammonium carbonate is all dissolved. Put seven hundred grams (24 ounces 300 grains, measuring about $29\frac{1}{4}$ fluidounces) of alcohol (which has been recently distilled and kept in glass vessels only) into a tared half-gallon bottle ; add to it twelve grams (185 grains) oil of lemon, one gram (15 grains) oil of lavender flowers, and one gram (15 grains) oil of pimento ; and finally, the solution of ammonium carbonate, prepared as described above, together with sufficient distilled water to make the final product weigh one thousand grams (35 ounces 120 grains, measuring 37 fluidounces). Filter the spirit through white filter paper, keeping the glass funnel well covered to prevent evaporation.

Must be kept in glass-stoppered bottles and in a cool place.

Should have no empyreumatic odor from the use of impure ammonium carbonate, and should be nearly colorless, or of a very pale straw-color. Clean pieces of ammonium carbonate should be picked out for this preparation. The oil of pimento makes this a more agreeable preparation than that of 1870.

Description and Tests.—See the Pharmacopœia, page 306. It darkens by long keeping.

Medicinal Uses.—Frequently employed as a stimulant and expectorant in sick headaches, fainting spells, etc.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms) in sweetened water.

Ammonii Chloridum; U. S.

CHLORIDE OF AMMONIUM.

Ammonicum Chloridum; Ammonium Chloride.—Ammoniæ Murias; Ammonia Muriatica, Ammonium Hydrochloratum—Salmiak, Chlorammonium, G.; *Chlorure d'ammonium, Sel ammoniac, Muriate d'ammoniaque*, F.; *Cloruro Amonico, Sal Amoniaco Purificada*, Sp.; *Klorammonium, Salmiak*, Sw.; *Muriate of Ammonia.*

Description and Tests.—See the Pharmacopœia, pages 32 and 33.

The use of commercial so-called "muriate of ammonia" ("sal ammoniac") is not permitted for pharmacopœial purposes. Only a perfectly white, odorless, crystalline (granulated) powder is to be used, and the tests prescribed require a pure chloride of ammonium. When heated it sublimes without residue and without first fusing. It has a salty bitter taste. Ninety cubic centimeters (3 fluidounces) water dissolve thirty grams (1 ounce) chloride of ammonium at 15° C. (59° F.), but when boiling water is used only forty cubic centimeters (1⅓ ounce) will dissolve the same quantity of the salt. A saturated aqueous solution has a specific gravity of 1.076 at 15° C. (Gerlach) and contains 26.2 per cent. salt. In alcohol it is only sparingly soluble.

Fluid extract of glycyrrhiza will be found to overcome, to a very great extent, the bitter taste of the chloride of ammonium. It is incompatible with alkalies, alkaline earths, or their carbonates.

Medicinal Uses.—Expectorant, diaphoretic, diuretic, alterative, cholagogue, and emmenagogue.

It is much used in chronic bronchitis, and is of value, especially in those cases accompanied by scanty expectoration of viscid tenacious mucus.

In dyspepsia, due to gastric catarrh, it has been found very satisfactory, especially if there is vomiting of mucus. It may be given in single doses, larger than usually quoted, thirty to forty, or even more grains, in the morning on an empty stomach, in a cup of warm milk, and continued for a week or more. It is disagreeable to the taste, and may produce vomiting once or twice, but after that the dose will be retained. It may be used alone, or together with pepsin, strychnine, etc., and in both ways with much success.

It has been used in chronic inflammation of the liver to prevent suppuration, in rheumatism, neuralgia, etc.

Externally, in solution, it is useful in acne, bursæ, indolent tumors, chronic inflammations, and swelling of glands or joints, corns, warts,

and the recent ecchymosis following contusions, as in the "black eye" resulting from an encounter with a fist.

Dose.—Five to forty grains (0.33 to 2.66 grams), or even more.

CHLORIDE OF AMMONIUM LOTION

usually consists of about thirty grams (1 ounce) ammonium chloride, thirty cubic centimeters (1 fluidounce) alcohol, and three hundred cubic centimeters (10 fluidounces) water. Sometimes vinegar is substituted for one-half of the water.

Used to bathe bruises, or applied on dressings for contusions.

CHLORIDE OF AMMONIUM MIXTURE.

Dissolve five grams (75 grains) ammonium chloride in a mixture of five cubic centimeters (1¼ fluidrachm) fluid extract of glycyrrhiza and ninety cubic centimeters (3 fluidounces) of fennel water.

Dose.—Twenty cubic centimeters (a tablespoonful).

AMMONII CHLORIDI TROCHISCI; U. S.

TROCHES OF CHLORIDE OF AMMONIUM.

A mixture of thirteen grams (or 200 grains) chloride of ammonium, sixty-five grams (or 1,000 grains) sugar, and 1.60 gram (25 grains) tragacanth, all in fine powder, made up into a mass with a sufficient quantity of syrup of tolu, will make one hundred troches.

Ammonii Iodidum; U. S.

IODIDE OF AMMONIUM.

Ammonicum Iodidum; Ammonium Iodide.—Hydriodate of Ammonia.

Description and Tests.—See the Pharmacopœia, page 33. Must be odorless and white, not yellowish or brownish from partial decomposition, when it smells of iodine. Thirty grams (1 ounce) dissolves in thirty cubic centimeters (1 fluidounce) water, and in two hundred and seventy cubic centimeters (9 fluidounces) alcohol.

Discolored ammonium iodide may be restored by washing with stronger ether and rapidly drying, as suggested in the Pharmacopœia.

Medicinal Uses.—Similar to the other alkaline iodides; it is pre-

scribed in syphilis, etc. Its effects are said to be more active, but less lasting.

Externally, it is used as an ointment in syphilitic eruptions or glandular swellings.

Dose.—0.05 to 0.5 gram (1 to 8 grains) in syrup.

AMMONII IODIDI UNGUENTUM.

OINTMENT OF AMMONIUM IODIDE.

Mix five grams ($\frac{1}{6}$ ounce) ammonium iodide with fifty grams ($1\frac{2}{3}$ ounce) petroleum ointment.

Ammonii Nitras; U. S.

NITRATE OF AMMONIUM.

Ammonicus Nitras; Ammonium Nitrate.

Description and Tests.—See the Pharmacopœia, page 33. It is soluble in less than its own weight of water, and in twenty times its weight of alcohol. It is used for preparing the "laughing gas" (nitrous oxide) used by dentists.

Ammonii Phosphas; U. S.

PHOSPHATE OF AMMONIUM.

Ammonicus Phosphas; Ammonium Phosphate.

Description and Tests.—See the Pharmacopœia, page 34. Soluble in four times its weight of water.

Uses.—To produce and maintain an alkaline condition of the blood in gout, rheumatism, and diabetes.

Dose.—0.50 to 1.50 gram (8 to 20 grains) three times a day.

Ammonii Succinatis Liquor.

SOLUTION OF SUCCINATE OF AMMONIUM.

Prinsen's Äkta Droppar, Sw.

Dissolve fifty grams (1 ounce 334 grains) succinic acid in four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) water, and then add enough empyreumatic hartshorn (see "Ammonii Carbonas Pyroleosus") to neutralize the acid. Set the whole aside for twenty-four hours in a cool place, shaking it occasionally. Then filter.

Ammonii Sulphas; U. S.

SULPHATE OF AMMONIUM.

Ammonicus Sulphas; Ammonium Sulphate.

Description and Tests.—See the Pharmacopœia, page 34. Forty cubic centimeters (1⅓ fluidounce) water dissolves thirty grams (1 ounce) of the salt. Nearly insoluble in alcohol.

Rarely, if ever, used in medicine.

Ammonii Valerianas; U. S.

VALERIANATE OF AMMONIUM.

Ammonicus Valerianas; Ammonium Valerianate.

Description and Tests.—See the Pharmacopœia, page 34. It is liable to gradually lose ammonia, and thus to give solutions with acid reaction, which may be neutralized by the careful addition of water of ammonia.

Medicinal Uses.—In nervous disorders, as hysteria, insomnia, headache, etc.

Dose.—0.10 to 0.50 gram (2 to 8 grains) in solution; average dose, about 0.25 gram (4 grains).

AMMONII VALERIANATIS ELIXIR.

ELIXIR OF VALERIANATE OF AMMONIUM.

Valerianate of ammonium is extensively prescribed by physicians in this country, and almost exclusively in the form of elixir.

Elixir of valerianate of ammonium may be prepared by simply dissolving fifteen grams (230 grains) of crystallized valerianate of ammonium in 1,000 cubic centimeters (34 fluidounces) of elixir of orange, and neutralizing carefully with water of ammonia. It is usually colored red with caramel or with tincture of cudbear, or both mixed.

The elixir of valerianate of ammonium prepared by this formula is of the usual strength—0.015 gram (0.23 grain) to each cubic centimeter (16 minims), or, in other words, "two grains to each teaspoonful."

Ampelopsis.

AMPELOPSIS.

Virginia Creeper, American Ivy.

Origin.—*Ampelopsis quinquefolia*, Michaux (*Ditaceæ*).

Habitat.—North America.

Parts used.—The young branches and bark.

Description.—Transverse segments, about finger thick or less; light gray, thin bark, which frequently splits off ; wood, white ; odor, none ; taste, bitter.

Constituents.—No analysis.

Medicinal Uses.—Alterative, expectorant, astringent, and tonic properties have been ascribed to this drug, and it has been given in scrofula and syphilis. Best given in the form of fluid extract.

AMPELOPSIDIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF AMPELOPSIS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces). Use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to three cubic centimeters (15 to 45 minims).

Amygdala Amara; U. S.

BITTER ALMOND.

Amygdali Semina Amara—Bittere Mandeln, G. ; *Amandes amères*, F.; *Almendra amarga*, Sp.; *Bittermandel*, Sw.

Origin.—*Amygdalus communis*, var. *amara*, Linné (*Rosaceæ*).

Habitat.—Cultivated in Southern Europe.

Part used.—The seeds.

Description.—See the Pharmacopœia, page 35. Bitter almond is somewhat smaller and less flat than the sweet almond. Emulsion of bitter almond has an odor of hydrocyanic acid.

The best bitter almond comes from Sicily and France. Must be sound and quite white interiorly.

Constituents.—About thirty to fifty per cent. *fixed oil* (sweet oil of almond), twenty to thirty per cent. *emulsin*, and one to three per

cent. *amygdalin.* The fixed oil is the same that exists in sweet almond.

The development of hydrocyanic acid when bitter almond is triturated with water is due to the fact that the *amygdalin* is decomposed by the *emulsin* in the presence of water, yielding glucose, oil of bitter almond, and hydrocyanic acid. As heat destroys the emulsin, cold water should be employed to bring about this reaction. Emulsin emulsifies the fixed oil when almonds (bitter or sweet) are beaten up with water.

Uses.—Probably never used except for flavoring purposes. Bitter almonds are poisonous in large doses. The medicinal effects of hydrocyanic acid are better obtained by giving hydrocyanated emulsion or diluted hydrocyanic acid than from any preparation of bitter almond, wild cherry, cherry-laurel, or any other drug containing hydrocyanic acid.

Amygdalæ Amaræ Oleum; U. S.

[Volatile] Oil of Bitter Almond.

Amygdalæ Amaræ Ætheroleum; Oleum Amygdalarum Æthereum—Bittermandelöl, G.; *Essence d'amandes amères,* F.; *Aceite de almendras amargas,* Sp.; *Bittermandelolja,* Sw.

Description.—See the Pharmacopœia, page 233. Volatile oil of bitter almond is benzaldehyd (C_7H_6O). Ordinarily it contains hydrocyanic acid, the presence of which is allowed by the Pharmacopœia. As to nomenclature, see page 75.

Artificial Oil of Bitter Almond, or "*Essence of Mirbane,*" is *nitrobenzol,* which has an odor closely resembling that of oil of bitter almond. The Pharmacopœia prescribes a test for its detection. It is used for odorizing soap, etc., the powerful odor of the nitrobenzol being sufficient to overcome the disagreeable one of inferior soap fats.

Medicinal Uses.—Same as of diluted hydrocyanic acid. Best given in the form of bitter almond water.

Dose of the oil: 0.01 to 0.06 cubic centimeter ($\frac{1}{6}$ to 1 drop).

AMYGDALÆ AMARÆ AQUA; U. S.

Bitter Almond Water.

Dissolve one gram (15 grains) volatile oil of bitter almond in one thousand cubic centimeters (34 fluidounces) of distilled water by shaking them together in a bottle, and then filter the solution through a well-wetted filter.

The volatile oil of bitter almond dissolves readily in the water without the use of cotton or any other medium for its distribution.

Bitter almond water does not keep well, and should therefore be made only in small quantities, or when wanted for use.

Medicinal Uses.—Used almost exclusively for flavoring purposes, as its medicinal strength (or the quantity of hydrocyanic acid it contains) is extremely variable.

Dose.—Three to ten cubic centimeters (50 to 120 minims).

AMYGDALÆ AMARÆ SPIRITUS.

Spirit of Bitter Almond.

Dissolve one gram (15 grains) volatile oil of bitter almond in one hundred cubic centimeters (3½ fluidounces) alcohol.

Flavoring extract of almond is made by dissolving fifteen cubic centimeters (½ fluidounce) of the volatile oil in five hundred cubic centimeters (17 fluidounces) alcohol.

Amygdala Dulcis; U. S.

Sweet Almond.

Amygdali Semina Dulcia—Süsse Mandeln, G.; *Amandes douces*, F.; *Almendra dulce*, Sp.; *Sötmandel*, Sw.

Origin.—*Amygdalus communis*, variety *dulcis*, Linné (*Rosaceæ*).

Habitat.—Cultivated in Southern Europe.

Figs. 23-25.—Sweet Almond, putamen and seed, whole and transverse section, natural size.

Part used.—The seeds.

Description.—See the Pharmacopœia, page 35. Larger and flatter than bitter almond. An emulsion of sweet almond does not have the odor of hydrocyanic acid; any such odor would prove the presence of bitter almond. Sweet almond should be large, sound, clean, whole, and perfectly white internally.

Blanched almonds are obtained by putting the almonds (bitter or sweet) in lukewarm water for a short time, after which the seed coat is readily removed. *Hot* water must not be used, as the emulsin is altered by a high temperature; *cold* water can be used if the almonds are soaked longer; but *warm* water is best.

Constituents.—About forty-five to fifty-six per cent. *fixed oil*, of the same kind as found in the bitter almond (sweet oil of almond). Sweet almond also contains *emulsin*, but no *amygdalin*.

Uses.—Sweet almond is used as an article of diet in diabetes, and to prepare an emulsion and a syrup which are employed as demulcent vehicles.

AMYGDALÆ MASSA.

Almond Paste.

Amygdalarum Pasta—Mandelnteig, G.; *Pâte d'amandes*, F.; *Mandelmassa*, Sw.

Beat together in a Wedgewood or stone mortar ten grams (154 grains) bitter almond and two hundred and fifty grams (8 ounces 358 grains) sweet almond, both previously blanched, with the gradual addition of orange-flower water, until reduced to a firm, smooth paste. Then incorporate with it two hundred and fifty grams (8 ounces 358 grains) powdered sugar, and mix thoroughly.

The paste should be of such consistence that it does not adhere to the fingers when handled.

When freshly prepared, this preparation forms with water a very pleasant demulcent drink (almond milk).

AMYGDALÆ MISTURA; U. S.

Almond Mixture.

Amygdalæ Emulsio; Emulsio Amygdalina; Emulsio Simplex—Mandelemulsion, G. and Sw.; *Mandelmilch*, G.; *Lait d'amandes, Emulsion simple*, F.; *Mandelmjölk*, Sw.; *Milk of Almonds.*

Blanch thirty grams (1 ounce) sweet almond, beat it into a smooth paste together with five grams (77 grains) powdered acacia and fifteen grams ($\frac{1}{2}$ ounce) sugar. Then triturate the paste with five hundred cubic centimeters (17 fluidounces) distilled water, gradually added, until a rich white emulsion is obtained. Strain.

A perfectly white emulsion cannot be made from the sweet almonds as ordinarily obtained without blanching them—*i.e.*, removing their brown seed coats, or at least washing away the powder which adheres to them by shaking vigorously with cold water and pouring this off.

Uses.—Almond mixture is an agreeable cooling drink, and a vehicle for other substances. Under the name of *Compound Emulsion of*

Almonds the German Pharmacopœia prescribes a preparation made from four parts sweet almond, one part hyoscyamus seed, sixty-four parts diluted bitter almond water, six parts sugar, and one part magnesia.

AMYGDALÆ PULVIS COMPOSITUS; B.

Compound Powder of Almonds.

Blanch sixty grams (2 ounces) sweet almonds. Wipe them well dry with a soft cloth. Triturate them lightly to a smooth paste. Add thirty grams (1 ounce) powdered sugar, and eight grams (¼ ounce) powdered acacia, and mix thoroughly, reducing the whole to a coarse powder. Keep the preparation in a tightly covered jar.

Uses.—For making almond milk, for which purpose seventy-five grams (2½ ounces) of the powder is triturated with five hundred cubic centimeters (17 fluidounces) of distilled water.

AMYGDALÆ SYRUPUS; U. S.

Syrup of Almond.

Blanch one hundred grams (3 ounces 230 grains) sweet almond, and thirty grams (1 ounce) bitter almond, and beat them to a smooth paste, adding gradually thirty grams (1 fluidounce) water, and one hundred grams (3 ounces 230 grains) coarsely powdered sugar. Triturate the pasty mixture with fifty grams (13½ fluidrachms) orange-flower water, aud three hundred grams (10 fluidounces) water. Strain the emulsion, using strong pressure, and add enough water to the residue, expressing it again, to obtain a total colature of six hundred grams (21 ounces 70 grains). In this dissolve four hundred grams (14 ounces 48 grains) coarsely powdered sugar by shaking, using no heat, and strain the finished syrup through muslin. This preparation does not keep well. It should be kept in small (500 cubic centimeters), well-filled, tightly corked bottles in a cool place.

Uses.—For flavoring or as a vehicle.

Amygdalæ Oleum Expressum; U. S.

Expressed Oil of Almond.

Amygdalarum Oleum—Fixed Oil of Almond—Mandelöl, G.; *Huile d'amandes douces*, F.; *Aceite de almendras dulces*, Sp.; *Mandelolja*, Sw.

Description.—See the Pharmacopœia, page 233. It is thinner than olive oil, and paler; thickens at 10° C. (14° F.), becomes whitish from solidified particles of palmitin at 16° C. (3.2° F.), and gets solid at 21°

C. (5.8° F.). It is non-drying, should be perfectly clear, pale, and correspond in all respects to the pharmacopœial requirements. Rancid oil of almond leaves an acrid sensation in the fauces.

This oil is frequently adulterated with oils from the seeds of peaches, apricots, etc. The most reliable test for the purity of expressed oil of almond is the congealing point; if pure, it will not congeal above 20° C. (4° F.).

Constituents.—It consists almost wholly of *olein*, the remainder being *palmitin*.

Preservation.—Is best kept in small, dry, well-filled and tightly corked bottles, in a cool place.

Medicinal Uses.—Sweet almond oil is a bland and unirritating oil much used as a demulcent. It is generally given in the form of an emulsion, sweetened to suit the taste.

Dose.—Ten to fifteen cubic centimeters (2½ to 4 fluidrachms).

LINCTUS OLEOSUS.

WHITE COUGH SYRUP.

Triturate ten grams (154 grains) finely powdered gum Arabic with thirty grams (1 ounce) sweet oil of almond; then add gradually twenty cubic centimeters (⅔ fluidounce) bitter almond water, triturating constantly; finally add thirty cubic centimeters (1 fluidounce) syrup of althæa, and mix the whole well.

This forms an elegant and agreeable emulsion.

Amygdalinum.

AMYGDALIN.

A crystalline neutral principle, extracted from bitter almond by means of boiling alcohol. White crystals of a pearly lustre; inodorous, but of a somewhat bitter taste. It is colored red by strong sulphuric acid. Soluble in twelve times its weight of cold water, but in its own weight of boiling water; in one thousand times its weight of cold alcohol, but in ten times its weight of boiling alcohol.

It is a glucoside. While the amygdalin itself is not poisonous it may, when taken into the body, come into contact with some animal ferment and give rise to hydrocyanic acid.

When brought together with emulsin it gives rise to hydrocyanic acid, volatile oil of bitter almonds, and sugar. Thus hydrocyanic acid is found in all plant parts where amygdalin and emulsin simultaneously exist, as in bitter almond, peach kernels, wild-cherry bark, the leaves of Prunus Laurocerasus, etc.

Amyl Nitris; U. S.

NITRITE OF AMYL.

Amylicus Nitris—Amyl Nitrite.

Description and Tests.—See the Pharmacopœia, page 35.

Must be kept in small, glass-stoppered bottles in a cool place.

It is obtained by the action of fuming nitric acid on fusel oil.

The smell of nitrite of amyl often produces headache. The odor is penetrating.

Medicinal Uses.—Amyl nitrite is usually administered by inhalation. It relieves spasm depending on nervous irritation, and it dilates the capillaries of the brain and face, causing flushing of the face.

It is used in *epilepsy*, *spasmodic asthma*, *whooping-cough*, *angina pectoris*, *persistent hiccough*, and has been found to moderate the severity of *hydrophobia*, though it did not have any curative effect in the latter disease.

Internally it may be given in two- to five-drop doses in aromatic spirit, but it is better given by inhalation in three- to five-drop doses.

Glass beads containing nitrite of amyl are sold which contain each a suitable average dose. These beads are broken in the handkerchief, and the amyl nitrite inhaled, when required.

Amylum; U. S.

STARCH.

Tritici Amylum; Wheat Starch.—Stärke, Kraftmehl, Weizenstärke, G.; *Fécule de froment, Amidon de blé*, F.; *Almidon*, Sp.; *Stärkelse, Hvetestärkelse*, Sw.

Origin.—Prepared from the seeds of *Triticum vulgare*, Villars (*Graminaceæ*).

Description and Tests.—See the Pharmacopœia, page 36.

Wheat starch is the only kind used for pharmacopœial purposes.

Starch is separated from the wheat by soaking the grains in warm water, first rendered just alkaline with sodium hydrate until soft, after which they are ground under water and then washed upon sieves under a slow stream of water, when the starch passes through and is collected after subsidence. The *gluten*, which differs from the starch by containing nitrogen, is held in the (alkaline) liquid. This process is sometimes called "*feculation*," and starch from various sources is termed "fecula."

Description.—See the Pharmacopœia, page 36.

It occurs in white columnar masses, or in the form of a pure white,

fine, soft powder; has a peculiarly slippery feel when rubbed between the fingers. The specific gravity is 1.5 to 1.6. By continued strong trituration enough starch may be taken up by cold water to strike a blue color on the addition of iodine. With hot water starch forms a semi-transparent mucilage. With heated glycerin it forms a jelly.

Under the microscope the granules of wheat starch are seen to be of substantially two kinds as to size, the large granules being about 0.025 to 0.030 millimeter (a little over $\frac{1}{1000}$ inch) in diameter, the smaller ones being only about one-sixth that diameter, there being scarcely any granules of intermediate sizes. The large wheat starch granules, which are the important ones for purposes of identification, are lenticular, thus having the appearance of being globular when seen on their flat surface. The "hilum," and the layers forming the "concentric rings" in other starch granules, are rarely distinguishable in wheat starch.

Uses.—For powdering, and thus protecting, irritated, inflamed, or chafed surfaces, in urticaria, prickly heat, etc. Starch jelly or paste is sometimes used as a vehicle for other remedies, especially in enemas; or alone as a demulcent in gastro-intestinal irritation. It is also a nutrient.

Starch paste, or starch mixed with water, is the best antidote in cases of poisoning by iodine, but must be followed by emetics and laxatives.

Starch is also used for bandages, and finally as a conspergative for pills, suppositories, troches, etc.

For other starches, see Mays, Oryza, etc.

AMYLI DECOCTUM.

Decoction of Starch.

Starch Paste.

Triturate thirty grams (1 ounce) starch with one thousand cubic centimeters (34 fluidounces) water, gradually added, and then bring the mixture to the boiling point.

The preparation is finished when the white mixture becomes a homogeneous semitransparent paste of the consistence of honey.

Uses.—Used alone as a soothing enema in *irritation* of the *bowels;* used also as a vehicle for other remedies.

Formerly starch paste was much more frequently employed than now for stiffening bandages, plaster-of-Paris having taken its place to a great extent.

Dose.—*Ad libitum.*

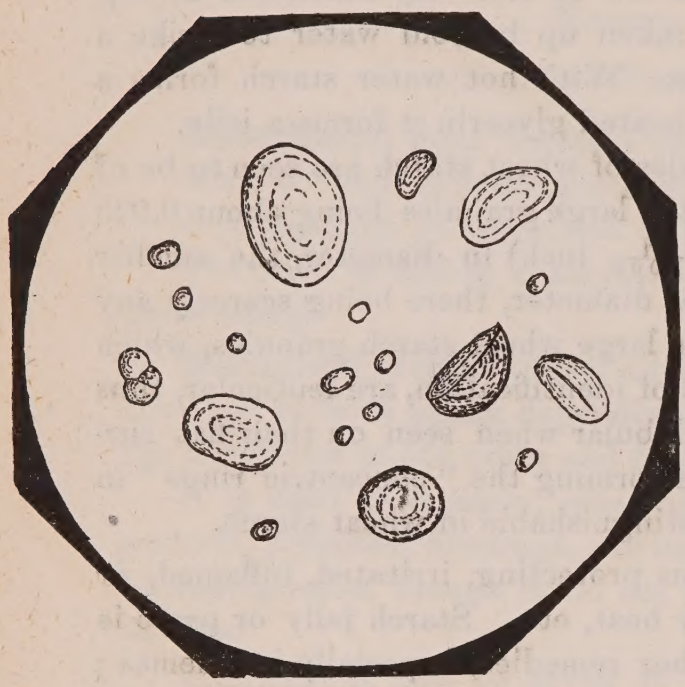


FIG. 26.—Wheat starch, magnified.

FIG. 27.—Starch of barley, magnified.

FIG. 28.—Potato starch, enlarged.

FIG. 29.—Sago starch, magnified.

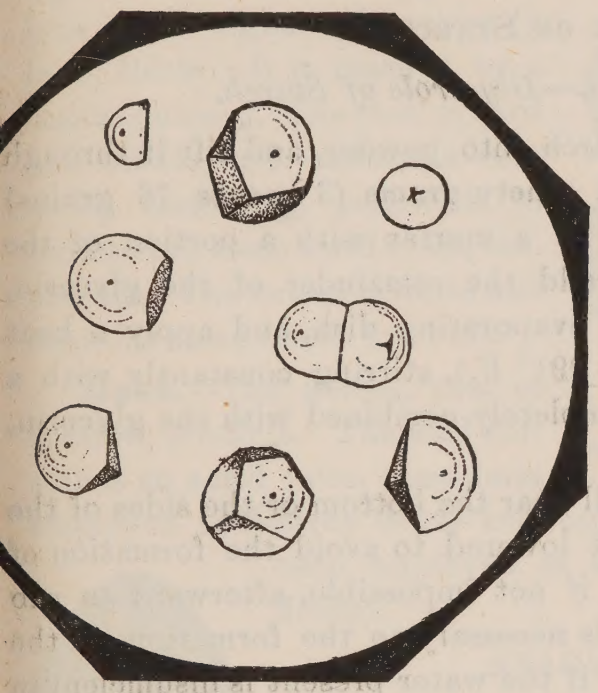


FIG. 30.—Tapioca starch, magnified.

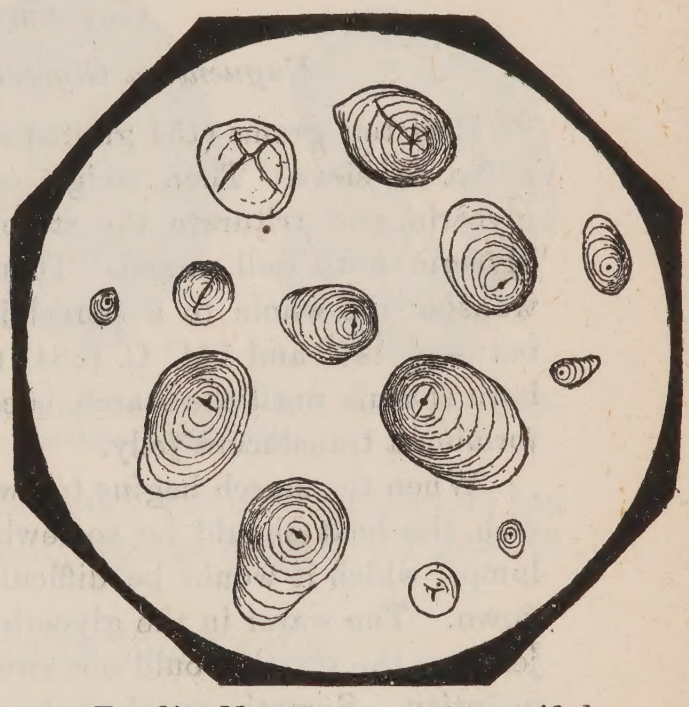


FIG. 31.—Maranta arrowroot, magnified.

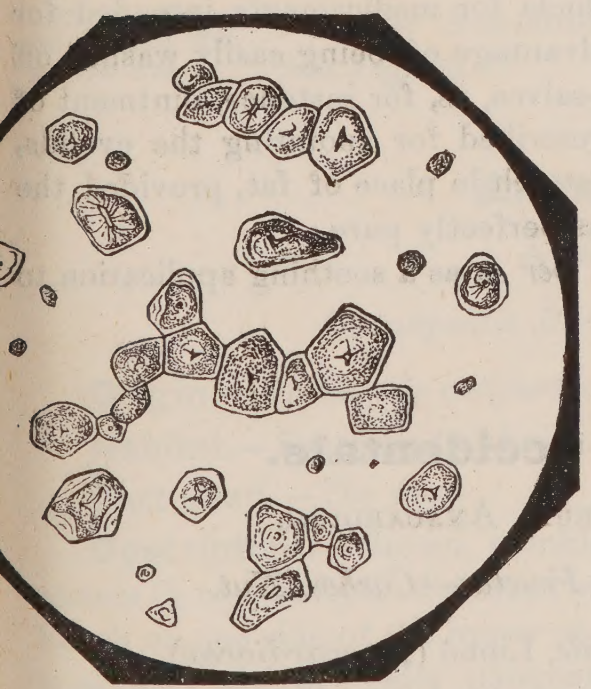


FIG. 32.—Corn starch, enlarged.

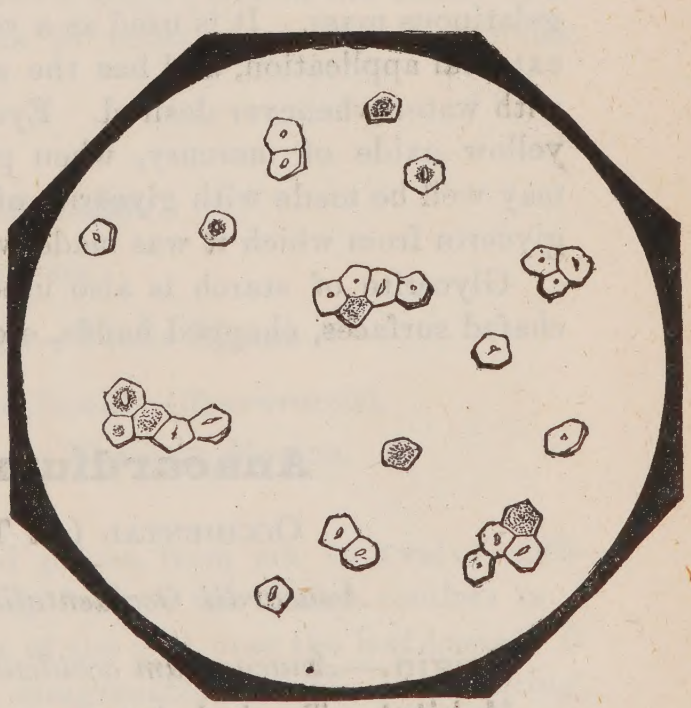


FIG. 33.—Rice starch, magnified.

AMYLI GLYCERITUM; U. S.

GLYCERITE OF STARCH.

Unguentum Glycerini.—Glycerole of Starch.

Rub ten grams (154 grains) starch into powder, and sift it through a No. 60 sieve. Then weigh out ninety grams (3 ounces 76 grains) glycerin, and triturate the starch in a mortar with a portion of the glycerin until well mixed. Then add the remainder of the glycerin, transfer the whole to a porcelain evaporating dish, and apply a heat between 140° and 144° C. (284° to 291° F.), stirring constantly with a horn spatula until the starch is completely combined with the glycerin, forming a translucent jelly.

When the starch begins to swell near the bottom or the sides of the dish, the heat should be somewhat lowered to avoid the formation of lumps, which it would be difficult, if not impossible, afterward to rub down. The water in the glycerin is necessary to the formation of the jelly, as the starch would not swell if the water present is insufficient in quantity. Sometimes, when the glycerin is exceptionally concentrated, the addition of a very small quantity of distilled water materially hastens and facilitates the process.

Glycerite of starch is a semisolid, semitranslucent, grayish-white, gelatinous mass. It is used as a vehicle for medicaments intended for external application, and has the advantage of being easily washed off with water whenever desired. Eye-salves, as, for instance, ointment of yellow oxide of mercury, when prescribed for anointing the eyelids, may well be made with glycerite of starch in place of fat, provided the glycerin from which it was made was perfectly pure.

Glycerite of starch is also used *per se* as a soothing application to chafed surfaces, chapped hands, etc.

Anacardium Occidentale.

OCCIDENTAL (OR TRUE) ANACARDIUM.

Anacardii Occidentalis Fructus—Cashew Nut.

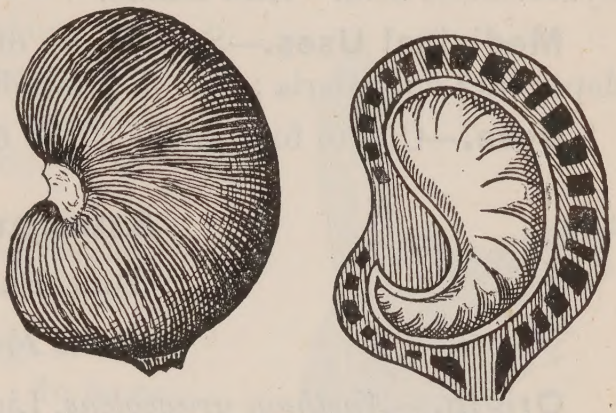
Origin.—*Anacardium occidentale*, Linné (*Anacardiaceæ*).

Habitat.—Tropical America; naturalized in Africa and the East Indies.

Part used.—The fruit.

Description and Constituents.—See Figs. 34 and 35. A kidney-

shaped, grayish-brown nut about twenty-five millimeters (1 inch) long, eighteen millimeters ($\frac{3}{4}$ inch) broad, and eight millimeters ($\frac{1}{3}$ inch) thick. It is marked by a scar at one end. The shell is hard and brittle, and contains a very acrid, vesicating, yellowish or reddish oil, some acrid resin, tannin, etc. The kernel is white and contains some bland fixed oil.



FIGS. 34, 35.—Cashew Nut, whole and longitudinal section, natural size.

Uses.—The kernel, raw or roasted, is edible. The rind furnishes an acrid juice, sometimes employed to destroy *warts* and *vegetations*. The oil from the rind has been employed as a vermifuge in doses of 0.2 gram (3 drops).

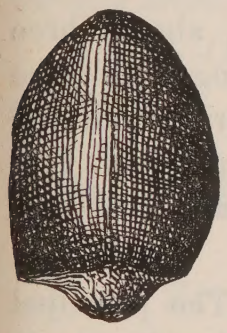


FIG. 36.—Oriental Cashew Nut, natural size.

ANACARDIUM ORIENTALE.

ORIENTAL CASHEW NUT.

The *Oriental Cashew Nut*, from *Semecarpus Anacardium* of East India, is heart-shaped, flattish, blackish brown, contains a brown acrid juice in the shell. Like the true Anacardium in constituents and properties. See Fig. 36.

Anemopsis.

ANEMOPSIS.

Anemopsidis Radix — Yerba Mansa.

Origin.—*Anemopsis californica*, Hooker (*Saururaceæ*).

Habitat.—Southern California and Northern Mexico.

Part used.—The root.

Description.—Brown, wrinkled pieces, from six to twelve millimeters ($\frac{1}{4}$ to $\frac{1}{2}$ inch) in diameter, with four to ten fleshy rootlets in a bunch on one side of the upper part of the root near the leaf bases. It is pinkish within. Odor pungent, disagreeable, and the taste biting, afterward leaving an impression of astringency. Sometimes grass stems grow through the substance of the roots, entering and emerging at points several inches distant in some cases (Lloyd).

Constituents.—About five per cent. of a pungent aromatic vola-

tile oil, which is heavier than water, and turns blue when agitated with hydrochloric acid. Also tannin.

Medicinal Uses.—Said to be of use in *diarrhœa* and *dysentery* depending on malaria; also in intermittent or malarial fever.

Dose.—One to four grams (15 to 60 grains); best in fluid extract.

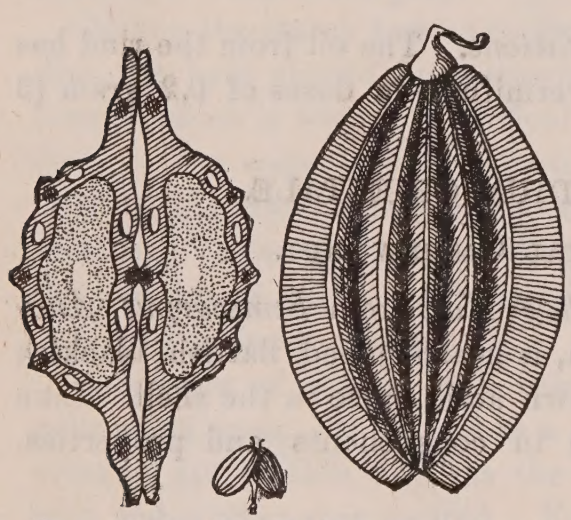
Anethum.

Dill Fruit.

Anethi Fructus.

Origin.—*Anethum graveolens*, Linné (*Umbelliferæ*).

Habitat.—Cultivated.



Figs. 37–39.—Dill Fruit, natural size, enlarged, and transverse section, enlarged.

Description.—See Figs. 37–39.

Brown, oval, flat, about three millimeters ($\frac{1}{8}$ inch) long, with three dorsal, sharp-keeled ribs, and the two lateral ribs forming a thin broad margin. Odor and taste aromatic.

Constituents.—The principal constituent is a volatile oil.

Uses.—Aromatic, stimulant, and carminative. Used in *flatulent colic*, *indigestion*, etc. Frequently employed as a condiment in soups, sauces, pickles, etc.

Angelicæ Radix.

Angelica Root.

Origin.—*Archangelica atropurpurea*, Hoffman (*Umbelliferæ*).

Habitat.—North America.

Description.—About ten to fifteen centimeters (4 to 6 inches) long, and one to two centimeters (about $\frac{1}{2}$ inch) thick, grayish-brown, wrinkled externally, whitish or yellowish, spongy within. The bark is about the same thickness as the woody portion. Large resin ducts are found in the bark. Must not be so dry as to be brittle. Has a strongly aromatic odor and a sweetish pungent taste. The powder is light yellowish-gray.

American angelica root has not been analyzed, but it evidently contains the same principles as have been found in the European drug,

which is obtained from *Archangelica sativa*, Fries, and which is not used in this country. These constituents are a colorless *volatile oil* of a strong aromatic odor and camphoraceous taste, a pungent but odorless resin (called *angelicin*), valerianic acid, and angelicic acid, which is pungent and aromatic. There is also a bitter principle present.

Should not be so dry as to be brittle, and must not be damaged by insects.

Medicinal Uses.—This drug is aromatic, stimulant, and carminative. In large doses expectorant and diaphoretic or diuretic; occasionally emetic.

Used in *flatulent colic, urinary troubles, chronic bronchitis*, etc.

Dose.—One to five grams (15 to 75 grains).

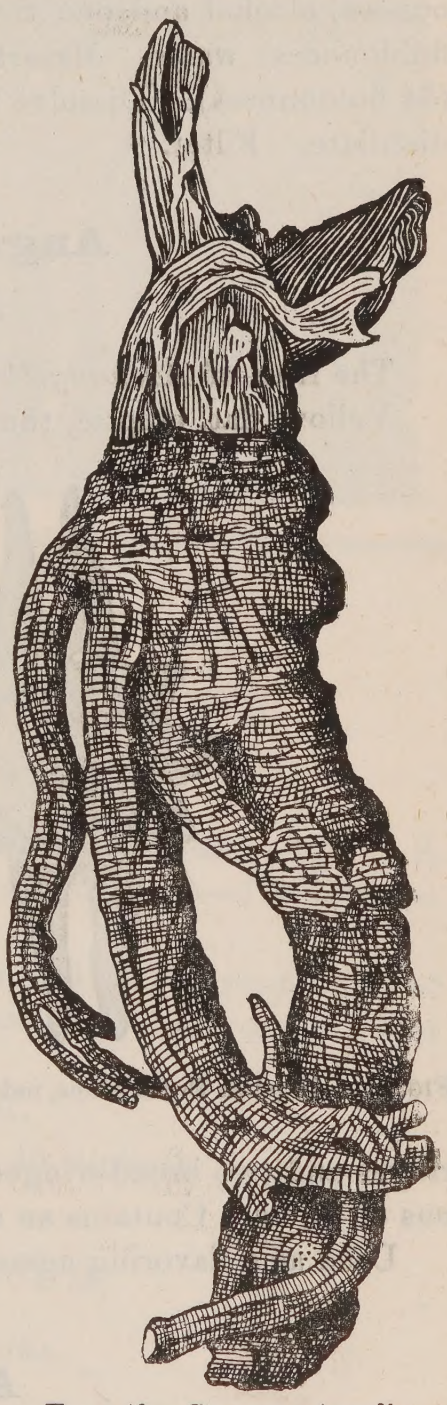


FIG. 40.—German Angelica Root, natural size.

ANGELICÆ RADICIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ANGELICA ROOT.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water, mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water. For suggestions as to details, see page 451.

Dose.—Two to five cubic centimeters (30 to 75 minims).

ANGELICÆ SPIRITUS COMPOSITUS.

COMPOUND SPIRIT OF ANGELICA.

Put one hundred and sixty grams (5 ounces 280 grains) angelica root, forty grams (1 ounce 180 grains) valerian, and forty grams (1

ounce 180 grains) juniper berries, previously cut and bruised, into a pharmaceutical still. Add nine hundred cubic centimeters (30 fluidounces) alcohol and one thousand two hundred cubic centimeters (40 fluidounces) water. Macerate twenty-four hours. Distil off one liter (34 fluidounces). Dissolve twenty grams (308 grains) camphor in the distillate. Filter.

Angelicæ Fructus.

ANGELICA FRUIT.

The fruit of *Archangelica atropurpurea*, Hoffman.

Yellow, flat, elliptic, the mericarps having three thick-heeled dorsal

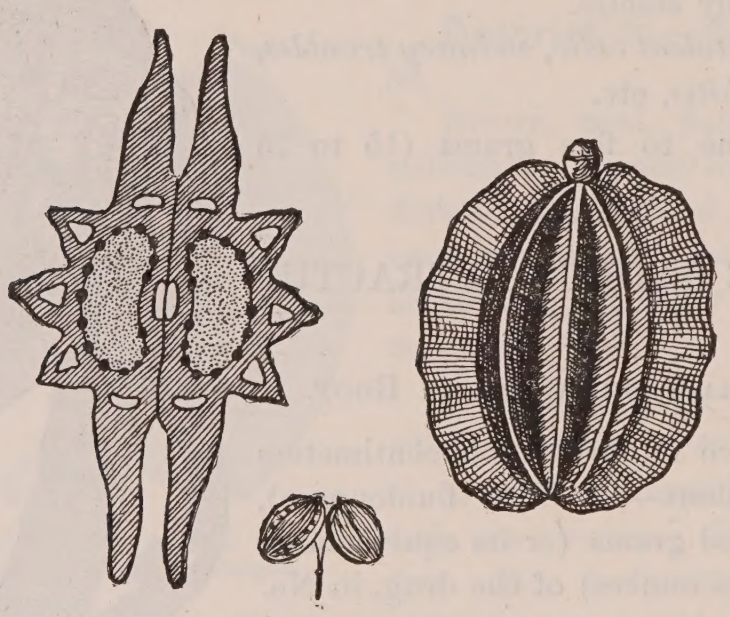


FIG. 41.—Angelica Fruit, whole, natural size, and enlarged, and transverse section enlarged.

ridges and two broad-winged lateral ridges. The fruit contains numerous oil-ducts. Contains an aromatic volatile oil.

Used as a flavoring agent.

Angustura.

ANGUSTURA.

Angusturæ Cortex.

Origin.—*Galipea Cusparia*, St. Hilaire (*Rutaceæ*).

Habitat.—South America, along the Orinoco.

Part used.—The bark.

Description.—Troughs or quills, several inches or even a foot or

more long, and one-twenty-fourth to one-eighth inch thick. Externally yellowish-gray, or, if the outer bark is removed, reddish-brown; inner surface cinnamon brown. Fracture smooth, resinous, reddish-brown, showing dark oil-cells and shining crystals of oxalate of calcium. Has an aromatic odor and a bitter taste.*

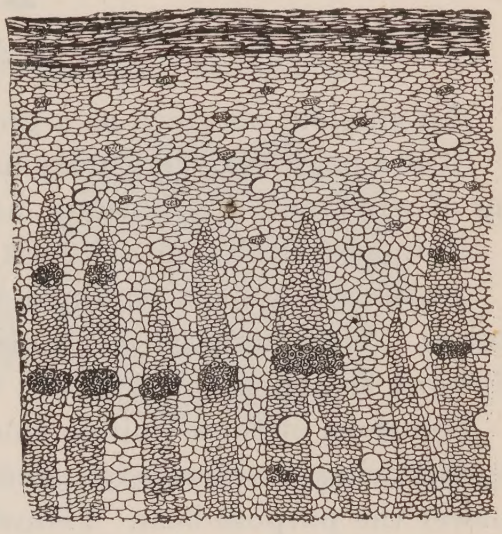


FIG. 42.—Angustura Bark, transverse section, magnified.

Constituents. — Contains volatile oil, resin, and a bitter principle called *cusparin.*

Medicinal Uses.—Angustura is a simple bitter tonic in doses of 0.5 to 2 grams (8 to 30 grains). Average dose about one gram (15 grains).

ANGUSTURÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ANGUSTURA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

For suggestions as to details, see page 451.

Dose.—1 to 2.5 cubic centimeters (15 to 40 minims).

ANGUSTURÆ INFUSUM.

INFUSION OF ANGUSTURA.

From fifteen grams (about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). About the same strength as the preparation of 1870.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms).

* "*False Angustura Bark*" is a myth or tradition, coming to us from the beginning of this century, when a bark of a variety of strychnos, by accident or through ignorance, was sold instead of Angustura bark. The term should be dropped, especially as the two barks do not resemble each other at all.

Anilina.

ANILINE.

An alkaloid obtained as a product of the distillation of coal-tar.

It is a colorless, oily, inflammable liquid of a peculiar odor, reminding of wine, and of a burning, aromatic taste.

Forms crystallizable salts with the acids.

Aniline colors are obtained by the action of various chemicals on aniline. Red, blue, purple, violet, yellow, green, and all possible shades of colors have been produced in the way of coal-tar dyes.

Solutions of these aniline colors in dilute alcohol are used for coloring flavoring extracts, etc., and very weak solutions will be found to answer the purpose best. Yellow aniline is a much better coloring agent than the old-fashioned turmeric, or even saffron. The quantity required for coloring is so infinitesimal as to be wholly unobjectionable.

Inks are made by dissolving aniline colors in hot water, with enough alcohol added to aid their solution and to keep the ink from spoiling, a little gum arabic and sugar being also put in to give body and luster to it. Violet and green inks, for instance, are made from five grams (75 grains) aniline color, four hundred cubic centimeters (13 fluidounces) hot water, seventy-five cubic centimeters (2½ fluidounces) alcohol, eight grams (120 grains) gum arabic, and eight grams (120 grains) sugar. The aniline is to be dissolved in the alcohol, previously mixed with twice its volume of water ; the gum arabic and sugar are dissolved in the remainder of the water, and the two liquids are mixed. The addition of about five cubic centimeters (1¼ fluidrachm) fluid extract of cloves tends to improve the keeping qualities of the ink.

Poisonous Effects.—Aniline colors are of interest to the physician, on account of the poisonous effects produced by some of these colors. Fabrics dyed with aniline have produced eczematous eruptions, and even such effects on the nervous system as giddiness, headache, staggering, etc.

Anisum ; U. S.

ANISE.

Anisi Fructus—Anis, G., F., Sp., and Sw.

Origin.—*Pimpinella Anisum*, Linné (*Umbelliferæ*).

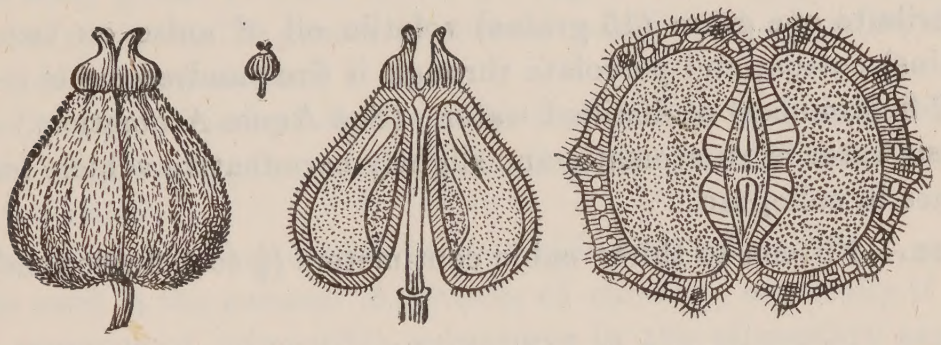
Habitat.—Cultivated in Italy, Germany, England, etc.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 36. Must be sound,

clean, and have the strong, sweet, aromatic odor and taste belonging to it. See Figs. 43–46.

Constituents.—Contains about two per cent. *volatile oil.*



FIGS. 43–46.—Anise, natural size, enlarged, and longitudinal and transverse sections enlarged.

Medicinal Uses.—Anise is a stimulant carminative used in *flatulent colic*, etc. It is also used as a condiment and as a flavoring agent.

Dose.—One to two grams (15 to 30 grains).

ANISI INFUSUM.

INFUSION OF ANISE.

Infuse fifty grams (1 ounce 334 grains) bruised anise about fifteen minutes in five hundred cubic centimeters (17 fluidounces) hot water, and then strain.

Anisi Oleum; U. S.

OIL OF ANISE.

Anisi Aetheroleum—Volatile Oil of Anise.

Origin.—The new Pharmacopœia permits the use of either volatile oil of anise, or volatile oil of star anise, both being designated as "oil of anise."

Most or nearly all of the "Essential Oil of Anise" on the market is really volatile oil of star anise.

Description.—See the Pharmacopœia, page 233. It will be seen that volatile oil of anise congeals usually at about 10° C. (50° F.) while the volatile oil of star anise does not congeal until at about 2° C. (35.6° F.).

Used for the same purposes as the fruit in doses of 0.3 to 1 cubic centimeter (5 to 15 drops).

ANISI AQUA; U. S.

Anise Water.

Distribute one gram (15 grains) volatile oil of anise on two grams (30 grains) cotton, and percolate through it five hundred cubic centimeters (17 fluidounces) of distilled water. (See Aquæ Aromaticæ.)

Anise water is an aromatic and slightly carminative vehicle for other medicines in colic, etc.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

ANISI ELÆOSACCHARUM.

Anise Sugar.

Triturate one gram (15 grains) volatile oil of anise with fifty grams (1 ounce 330 grains) finely powdered sugar until intimately mixed.

Used to flavor powders.

ANISI ELIXIR.

Anise Cordial.

Bruise one hundred grams (3 ounces 230 grains) anise and macerate it five days with two hundred and fifty cubic centimeters ($8\frac{1}{2}$ fluidounces) alcohol. Strain, filter, and then add three hundred and fifty cubic centimeters (12 fluidounces) simple syrup and enough anise water to make the whole measure one thousand cubic centimeters (34 fluidounces).

Anise cordial is used in infantile colic.

Dose.—For an infant, from one to twenty drops.

ANISI ESSENTIA; B.

Essence of Anise.

Dissolve thirty cubic centimeters (1 fluidounce) volatile oil of anise in one hundred and twenty cubic centimeters (4 fluidounces) rectified spirit (strength : 90 per cent. by volume of alcohol).

Dose.—0.50 to 1 cubic centimeter (8 to 15 minims). This preparation of the British Pharmacopœia should not be confounded with the spirit of anise of the United States Pharmacopœia (see below).

ANISI PULVIS COMPOSITUS.

Compound Anise Powder.

Mix sixty grams (2 ounces) heavy magnesia, thirty grams (1 ounce) powdered rhubarb, 7.5 grams ($\frac{1}{4}$ ounce) volatile oil of anise, and ten grams (154 grains) alcohol.

The volatile oil is first dissolved in the alcohol and then triturated with the magnesia, after which the rhubarb is added, and the whole mixed intimately.

The preparation has a pink or brownish-pink color.

It is used in the *summer diarrhœas* of children, especially if caused by the presence of indigestible substances in the alimentary canal, and if accompanied with *colic*.

Dose.—0.3 to 0.5 gram (5 to 8 grains).

ANISI SPIRITUS; U. S.

Spirit of Anise.

Dissolve ten grams (154 grains) oil of anise in ninety grams ($3\frac{3}{4}$ fluidounces) alcohol.

Used for flavoring.

ANISI SPIRITUS AMMONIATUS.

Ammoniated Spirit of Anise.

Liquor Ammonii Anisatus, G.

Dissolve ten grams (154 grains) volatile oil of anise in two hundred and forty grams (8 ounces 200 grains, measuring about 10 fluidounces) alcohol, and add fifty grams (1 ounce 334 grains, or about $1\frac{5}{8}$ fluidounce) water of ammonia.

The product is clear, yellowish.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

ANISI SYRUPUS.

Syrup of Anise.

Dissolve six hundred and fifty grams (23 ounces) sugar in three hundred and fifty cubic centimeters (12 fluidounces) anise water without using heat.

Used for flavoring.

Anthemis; U. S.

ANTHEMIS.

Anthemidis Flores—*Chamomilla Romana*—*Römische Kamille*, G.; *Chamomille Romaine*, F.; *Romersk Kamomilla*, Sw.—*Roman Chamomile; English Chamomile.*

Origin.—*Anthemis nobilis*, Linné (*Compositæ*).

Habitat.—Cultivated in Europe.

Part used.—The flower head.

Description.—See the figures, and the Pharmacopœia, page 37. Must have a bright, good color, strong, pleasant, aromatic odor, and bitter taste. A discolored drug must be rejected.

FIGS. 47–52.—Anthemis. Whole flower-head, vertical section of flower-head, ray and disk florets, stigma and fruit, all enlarged.

Constituents.—From three-fifths to four-fifths per cent. of blue or greenish *volatile oil*, and a bitter principle not well known.

Medicinal Uses.—Chamomile is a stimulant tonic and carminative. In large doses emetic. Most frequently employed as a diaphoretic, in copious draughts of hot but weak infusion, while the patient is covered up in bed. The diaphoretic effect is mainly due to the hot water, though promoted by the relaxation produced by the nauseating effect of the chamomile. Externally chamomile is often used to relieve *pain*, in the form of hot fomentations over the abdomen in *colic*, in *retention of urine*, etc.

Small bags or pillows filled with chamomile, applied warm, often relieve *toothache* or *facial neuralgia.*

Chamomile is generally given in tea.

ANTHEMIDIS INFUSUM.

INFUSION OF ANTHEMIS.

From fifteen grams (about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). About the same strength as the preparation of 1870.

Dose.—About fifty cubic centimeters (12 fluidrachms).

ANTHEMIDIS EXTRACTUM.

EXTRACT OF ANTHEMIS.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Dark brown. According to the British Pharmacopœia it is made by *boiling* the flowers with water, straining, evaporating, and finally adding some volatile oil of chamomile. This is an inferior process.

Dose.—0.10 to 0.65 gram (2 to 10 grains).

ANTHEMIDIS OLEUM INFUSUM.

INFUSED OIL OF CHAMOMILE.

Chamomile Liniment.

Digest one hundred grams (3 ounces 230 grains) anthemis for two hours on a water-bath with one thousand grams (35 ounces) olive oil, stirring occasionally. Strain by expression and filter.

Used as a liniment.

Anthemidis Oleum.

OIL OF CHAMOMILE.

Anthemidis Ætheroleum—Volatile Oil of Anthemis.

A volatile oil lighter than water and having a blue or greenish color and the strong characteristic odor of Roman (or English) chamomile. Seldom employed.

Antiaris.

UPAS ANTIAR.

Javanese Arrow-Poison.

Origin.—*Antiaris toxicaria*, Lesch (*Urticaceæ*).

Habitat.—Java.

Description.—A gum-resinous exudation. It is a reddish-brown, waxy substance, of an extremely bitter, acrid taste. Forms an emulsion with water, and is partially soluble in alcohol. The poisonous constituent is *antiarin*, which has been obtained in white crystalline scales, is soluble in alcohol, and is present in the gum-resin.

Upas Antiar is the most if not the only important ingredient in the celebrated Upas arrow-poison of Java.

Medicinal Properties.—It has not been used in medicine, but its effects resemble those of Calabar bean.

Antimonium.

ANTIMONY.

Stibium—Regulus Antimonii—Antimon, G.; *Antimoine*, F.; *Antimonio*, Sp.; *Antimon*, Sw.

A bright, tin-white, heavy metal of crystalline structure; brittle and pulverizable; melting at 425° C. (nearly 800° F.). It is not affected by hydrochloric acid, nor by cold sulphuric acid. Nitric acid oxidizes it, the oxide being in the form of an insoluble powder. Nitro-hydrochloric acid dissolves the metal.

Alloys of antimony are much used. *Britannia metal* consists of one part antimony and one part tin; *type metal* contains three to four parts lead and one part antimony, with occasionally some copper or bismuth added.

The salts of antimony are decomposed by water unless a sufficient quantity of free acid is present. Tartaric acid prevents precipitation. Potassa or ammonia gives a white precipitate with antimony salts; the precipitate is soluble in an excess of potassa, but not in ammonia. Acid solutions of antimony compounds give orange-red precipitates with hydrosulphuric acid.

The only medicinal chemical preparation of antimony which is soluble in water to any considerable extent is the tartrate of antimony and potassium.

Antimonii Chloridi Liquor; B.

SOLUTION OF CHLORIDE OF ANTIMONY.

Butter of Antimony.

Prepared by boiling finely powdered sulphide of antimony with hydrochloric acid until saturated, and boiling down the solution to 47° Baumé (1.48 specific gravity).

It is an acid liquid of yellowish-red color (from iron chloride), and

yields a white precipitate when mixed with water. This precipitate is *oxychloride of antimony*, also called *Algaroth's powder.*

Must be kept in glass-stoppered bottles, being too corrosive for corks.

Medicinal Uses.—Powerfully escharotic, and employed to destroy diseased tissues, as in *bites of rabid animals, malignant pustule, chancre, syphilitic vegetations*, etc. If taken internally it is an exceedingly corrosive poison, to be combated with chalk, magnesia, etc.

Antimonii et Potassii Tartras; U. S.

TARTRATE OF ANTIMONY AND POTASSIUM.

Antimonioso-Potassicus Tartras—Antimonium Tartaratum; Tartarus Stibiatus; Tartras Stibico-Kalicus—Brechweinstein, G.; *Tartrate de potasse et d'antimoine, Tartrate emétique, Tartre Stibié*, F.; *Tartrato Antimonico-Potasico, Tartrato emetico*, Sp.; *Kräkvinsten, Kräksalt*, Sw.—*Tartar Emetic, Tartarated Antimony.*

Description and Tests.—See the Pharmacopœia, page 37.

An aqueous solution of tartrate of antimony and potassium soon spoils, like most solutions containing compounds of the organic acids. It is insoluble in alcohol, but a small quantity of alcohol added to the aqueous solution will prevent this from moulding.

Must be kept in well-closed bottles.

Medicinal Uses.—This is the form in which antimony is generally employed in medicine. In small doses it is nauseant, and, like other remedies of this kind, produces increased secretion of saliva, increased perspiration and expectoration, and flow of bile.

In larger doses, 0.05 gram (1 grain) or more, it produces vomiting accompanied by much nausea and depression. The evacuations from the bowels become profuse until they resemble the "rice-water discharges" of cholera.

The depression and relaxation of the tissues, caused by tartar emetic, favor subsequent absorption of other remedies.

Tartar emetic is much used in small doses as an expectorant and nauseant in the first stages of many diseases, such as *acute catarrh, bronchitis*, etc.

Poisonous Effects.—In toxic doses this remedy produces intense gastro-intestinal irritation, vomiting, purging, epigastric pain, extreme depression, collapse, occasionally convulsions and death.

Tannic acid and preparations containing it, forming insoluble tannates, are useful as antidotes for tartar emetic.

The gastro-intestinal irritation and the depression must be combated with demulcents, opium, and stimulants.

Dose as an expectorant and nauseant, 0.005 to 0.015 gram ($\frac{1}{12}$ to $\frac{1}{4}$ grain); as an emetic, 0.03 to 0.12 gram ($\frac{1}{2}$ to 2 grains).

ANTIMONII EMPLASTRUM.

Antimony Plaster.

Melt together one hundred and twenty grams (4 ounces) Burgundy pitch and fifteen grams ($\frac{1}{2}$ ounce) yellow wax, strain the mixture, then add thirty grams (1 ounce) powdered tartrate of antimony and potassium, and stir well until the mixture thickens by cooling.

The tartrate of antimony and potassium must be in extremely fine (impalpable) powder.

This preparation was official in the old Pharmacopœia (1870), but without the yellow wax, the addition of which improves its consistence. It is not in the new Pharmacopœia.

Uses.—A suppurant application to produce counter-irritation.

ANTIMONII UNGUENTUM.

Antimonial Ointment.

Antimonioso-Potassici Tartratis Unguentum; Unguentum Stibiatum—*Pockensalbe*, G.; *Pommade Stibiée, Pommade d'Authenrieth*, F.; *Ointment of Tartrate of Antimony and Potassium.*

Mix intimately one gram (15 grains) tartrate of antimony and potassium, in impalpable powder, with four grams (60 grains) lard.

An improvement in this preparation would be the substitution of petroleum ointment for the lard.

Medicinal Uses.—Now very rarely employed. Formerly used as a suppurative counter-irritant in *tubercular meningitis*, etc. It produces no good results, and is apt to leave disfiguring scars which are permanent.

ANTIMONII VINUM; U. S.

Wine of Antimony.

Vinum Stibiatum—*Brechwein*, G.; *Vin antimonié, Vin Stibié*, F.; *Vino de Tartrato Antimonico Potasico; Vino emetico*, Sp.; *Kräkvin*, Sw.—*Antimonial Wine.*

Dissolve four grams (62 grains) tartrate of antimony and potassium in sixty grams (2 fluidounces) boiling water, and mix the hot solution

with six hundred grams (22 fluidounces) stronger white wine (see page 1022). Filter through paper, and then add through the filter enough stronger white wine to make the filtered liquid weigh one thousand grams (measuring 36 fluidounces).

Medicinal Uses.—It is used as an expectorant and nauseant, but seldom as an emetic. Frequently added to cough mixtures.

Dose.—0.5 to 1 cubic centimeter (8 to 15 minims), repeated at short intervals until the effect is produced.

Antimonii Oxidum; U. S.

Oxide of Antimony.

Antimoniosum Oxidum; Antimonious Oxide—Stibium Oxydatum; Oxidum Stibicum—Antimonoxyd, G.; *Oxyde d'antimoine*, F.; *Oxido antimonico*, Sp.; *Antimonoxid*, Sw.

Description and Tests.—See the Pharmacopœia, pages 37 and 38.

Uses.—For preparing antimonial powder. It has the properties of other antimony preparations, but in a milder degree owing to its comparative insolubility.

Dose.—0.05 to 0.25 gram (1 to 4 grains).

ANTIMONIALIS PULVIS; U. S.

Antimonial Powder.

James' Powder.

Mix intimately, by trituration, thirty-three grams oxide of antimony and sixty-seven grams precipitated phosphate of calcium, or one ounce of the former with two ounces of the latter.

The original and genuine James' powder was a preparation of variable and uncertain composition, and this official preparation is a decided improvement upon the "genuine."

Medicinal Uses.—Same as of oxide of antimony.

Dose.—0.03 to 0.1 gram ($\frac{1}{2}$ to 2 grains) as a diaphoretic; 0.25 to 1 gram (4 to 15 grains) as an emetic.

Antimonii Oxysulphuretum.

OXYSULPHURET OF ANTIMONY.

Kermes Mineralis—Stibium Sulphuratum Rubeum; Sulphur Stibiatum Rubeum; Alkermes aurificum minerale—Mineralkermes, G.; *Sulfure d'antimoine hydraté, Kermès Minéral, Poudre des chartreux*, F.; *Quermes mineral, Oxisulfuro de Antimonio hidratado*, Sp.; *Kermes*, Sw.—*Kermes Mineral.*

When properly prepared this is a beautiful soft, velvety, dark purplish-brown (not brown or red) powder. It is a mixture of antimonious sulphide with antimonious oxide in varying proportions. On account of its variable composition it has been dropped from the Pharmacopœia (1880). The discontinuance of its use would perhaps be no sacrifice, since other similar preparations of antimony remain, all having about the same effects.

Medicinal Uses.—Similar to those of antimonium sulphuratum. It has been much praised as an emetic in croup. In some parts of Europe it is frequently prescribed in powders and mixtures for coughs.

Dose.—0.01 to 0.05 gram ($\frac{1}{6}$ to 1 grain) two or three times daily. As an emetic, 0.25 to 1 gram (4 to 15 grains).

The Swedish Pharmacopœia has an expectorant cough powder under the title of

PULVIS GUMMOSUS STIBIATUS,

which consists of 2.50 grams ($38\frac{1}{2}$ grains) kermes mineral, 22.50 grams (350 grains) sugar, and seventy-five grams (2 ounces 280 grains) compound althæa powder (see page 111).

Antimonii Sulphidum; U. S.

SULPHIDE OF ANTIMONY.

Antimoniosum Sulphidum; Antimonious Sulphide—Antimonii Sulphuretum; Antimonium Nigrum; Stibium Sulphuratum; Sulfuretum Stibicum—Schwefelspiessglanz, G.; *Sulfure d'antimoine, Antimoine crue*, F.; *Antimonio crudo, Sulfuro antimonico*, Sp.; *Spetsglans, Svafvelantimon*, Sw.—*Black Antimony; Black Sulphuret of Antimony.*

Description and Tests.—See the Pharmacopœia, page 38. Much of the commercial "Black Antimony" or "Black Sulphuret of Antimony" in powder is largely adulterated. As it is used only in powder,

however, and as pharmacists cannot conveniently powder it, the necessity of testing the powdered sulphide of antimony is obvious. It must dissolve in hydrochloric acid with but a slight residue.

Uses.—For making other preparations of antimony. Medicinal properties similar to those of sulphurated antimony.

Dose.—0.25 to 1 gram (4 to 15 grains). Usually given in combination with drastic purgatives.

ANTIMONII SULPHIDUM PURIFICATUM; U. S.

PURIFIED SULPHIDE OF ANTIMONY.

Antimoniosum Sulphidum Purificatum—Purified Antimonious Sulphide.

Not in the Pharmacopœia of 1870. Prepared according to the new Pharmacopœia (1880) by macerating the native sulphide of antimony, in finest powder, with water of ammonia for several days, and then washing the residue with water. This removes all but traces of arsenic. See the Pharmacopœia, pages 38 and 39.

Used for the preparation of sulphurated antimony.

Antimonii Sulphidum Flavum.

YELLOW ANTIMONY SULPHIDE.

Antimonicum Sulphidum; Antimonic Sulphide—Pentasulphide of Antimony.

This sulphide of antimony is official in several pharmacopœias, and is probably less liable to variation or change than the sulphurated antimony or the oxysulphuret of antimony. It is prepared as follows:

Preparation.—Mix three hundred and sixty grams (12 ounces 300 grains) purified sulphide of antimony and eighty grams (2 ounces 360 grains) sublimed sulphur. Put one thousand grams (35 ounces 120 grains) solution of soda (containing twenty per cent. Na_2O, or having a specific gravity of 1.29) in a clean iron pot; add the mixture of sulphide of antimony and sulphur. Boil the contents of the pot, replacing the water lost by evaporation from time to time and stirring constantly, until no more of the powder dissolves. Filter. Evaporate the filtrate to crystallization. Rinse the crystals carefully with a little weak soda solution, and dry them by pressing them between blotting-paper. These crystals are "Schlippe's Salt."

Dissolve one hundred parts of these crystals in four hundred parts distilled water. Filter. Dilute the filtrate with six hundred parts dis-

tilled water; pour the diluted solution slowly and during constant stirring into a cold mixture of thirty-six parts sulphuric acid and six hundred parts distilled water. Wash the precipitate as rapidly as possible by affusion and decantation with distilled water, express the remainder of the water, dry the precipitate at a low heat, and powder it. Must be kept in small well-filled bottles, tightly closed with paraffined corks.

Description.—It is a fine orange-yellow powder. Must be odorless and tasteless. By exposure to sunlight or moisture it becomes discolored or acquires an odor of hydrosulphuric acid. It has a very slightly acid reaction, yields nothing to water, is entirely soluble in about twelve parts ammonia water, and if prepared as described does not contain arsenic.

Dose.—0.01 to 0.05 gram ($\frac{1}{6}$ to 1 grain) every three or four hours.

Antimonium Sulphuratum; U. S.

Sulphurated Antimony.

Antimonii Sulphuretum Aureum; Stibium sulfuratum aurantiacum—Goldschwefel, G.; *Soufre doré antimoine*, F.; *Golden Sulphuret of Antimony—Golden Sulphur.*

Consists of precipitated antimonious sulphide mixed with a small quantity of antimonious oxide.

Preparation, Description, and Tests.—See the Pharmacopœia, page 39. It is a reddish-brown, odorless, and tasteless powder, insoluble in water, but nearly all dissolved by hydrochloric acid when treated with it.

Medicinal Uses.—Frequently added to cough mixtures in *catarrhal* or *inflammatory affections* of the pulmonary organs. Useful in cases accompanied by difficult and scanty secretion of tough mucus in *chronic bronchitis;* also in *bronchorrhœa* and *blenorrhœa.* Often combined with squill, senega, ipecac, and other expectorants.

Dose.—0.01 to 0.06 gram ($\frac{1}{6}$ to 1 grain) every three or four hours.

Apium.

Celery Seed.

Origin.—*Apium graveolens*, Linné (*Umbelliferæ*).

Habitat.—Cultivated.

Part used.—The fruit.

Description.—About one millimeter ($\frac{1}{25}$ inch) long, oval, compressed, brown, divided into two mericarps, each with five fine ribs, and containing twelve oil tubes. Odor and taste aromatic.

Constituents.—A *volatile oil.*

Properties and Uses.—An aromatic carminative and stimulant; also diuretic. Used chiefly as a flavoring agent.

Dose.—About one gram (15 grains).

Apocynum; U. S.

APOCYNUM.

Apocyni Cannabini Radix.—Canadian, Hemp, or Black Indian Hemp—Apocynum Cannabinum.

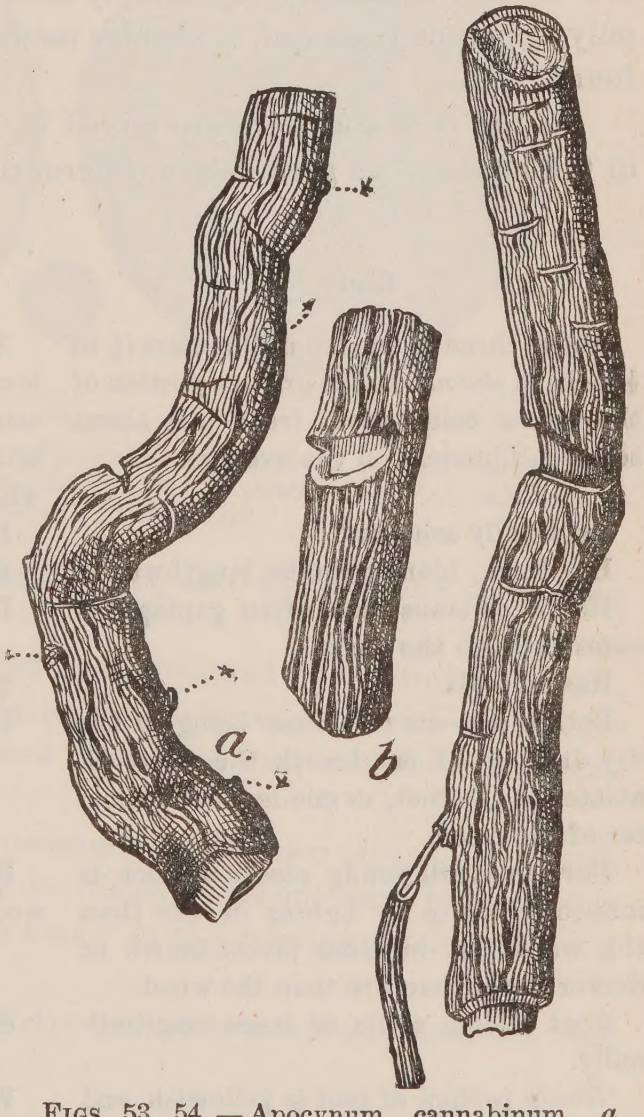
Origin.—*Apocynum cannabinum*, Linné (*Apocynaceæ*).

Habitat.—The United States.

Part used.—The root.

Description.—See the Pharmacopœia, page 40.

The pharmacopœial description is erroneous in two particulars: It states that the root is externally "pale brown," and that it contains "a thin pith," whereas it is ash-gray, and contains no pith. Confusion has existed in regard to the roots of Apocynum cannabinum and Apocynum androsæmifolium. At the present time, and for years past, these drugs have been confounded with each other, mixed with each other, and mixed with the stems of both plants, and the stem of one or the other has been described as the root. It has been stated that in the trade the roots of both plants usually occur mixed, when, in fact, this is of less frequent occurrence than a mixture of the root with the stem of the same species.



FIGS. 53, 54.—Apocynum cannabinum. *a*, stem, natural size; *, undeveloped buds; *b* and *c*, root, natural size, rather above the average size.

We have had opportunity to examine numerous specimens of drugs sold respectively as Apocynum cannabinum, and as Apocynum androsæ-

mifolium. Most of these specimens consisted chiefly of roots and stems of Apocynum cannabinum, although many of them were sent to us as specimens of the root of Apocynum androsæmifolium. In one single instance only did we receive unmixed samples of the roots of the two species respectively.

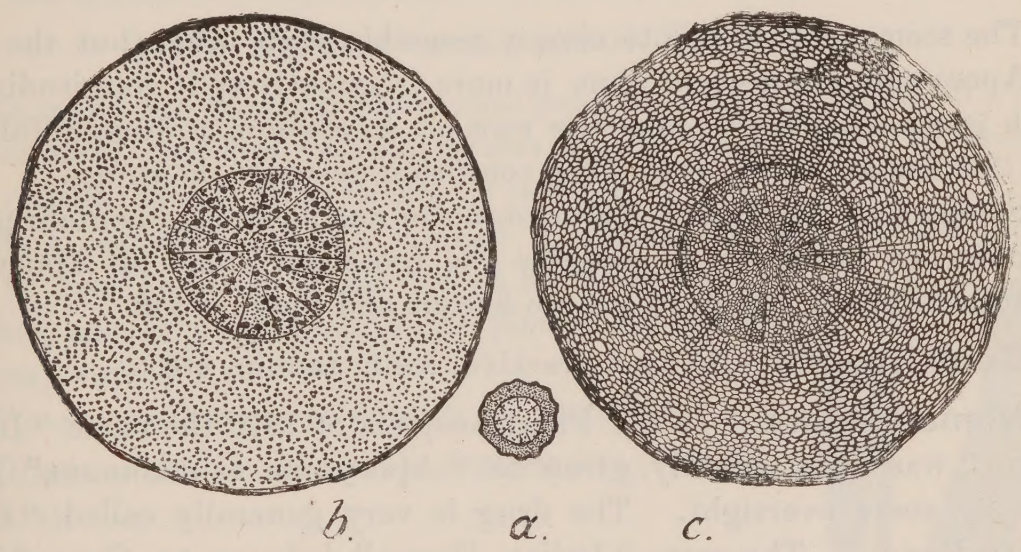
In the Proceedings of the American Pharmaceutical Association for 1881 (Vol. 29) is a paper on the microscopic structure of the two roots, which contains material errors, notably in describing and figuring sections of *stems* as sections of the root of Apocynum androsæmifolium. In another description the whole of the wood is referred to as "medullary matter," while at the same time a figure is given showing bark, wood, and pith, whereas the roots of both plants under consideration lack pith, the delicate medullary rays simply meeting at the center, where at most only apparent traces of a slender medullary column may sometimes be found.

As the root and stem are mixed in the drug as generally occurring in the market, we give here a differential diagnosis of the two :

ROOT.	STEM.
About three to twelve millimeters ($\frac{1}{8}$ to $\frac{1}{2}$ inch) in *diameter*, the greater portion of the pieces being most frequently about seven millimeters on the average.	Where the stem starts from the root it is usually thicker than the latter. At the same time the detached pieces of stem mixed with the root are generally somewhat less thick than the pieces of root.
Externally ash-gray.	Externally brown.
Has thick, blunt wrinkles lengthwise.	Has fine wrinkles lengthwise.
Has deep transverse, often gaping, fissures through the bark.	Has no deep fissures.
Has no buds.	Shows buds.
Bark thick—its thickness being in the dry drug about one-fourth the entire diameter of the root, or one-half the diameter of the wood.	Bark thin.
Bark in small young pieces of root is interiorly white or lighter in *color* than the wood, but in older pieces brown or darker in the fracture than the wood.	Bark always brown or darker than the wood.
Root seldom splits or tears longitudinally.	Stem frequently splits longitudinally.
Woody portion of root is yellowish, and in young pieces brittle and porous, while in older pieces it is fibrous and tough.	Woody portion always more or less tough.
Has no pith or central cavity.	Either has a plain pith, or is hollow in the center.
Taste extremely bitter, disagreeable.	Taste slightly or scarcely bitter.

The root of Apocynum cannabinum has a reddish-brown cambium line between bark and wood. In the stem this is also the case, and a similar brown line separates the woody ring of the stem from its pith. The thin corky layer of the bark of both root and stem sometimes chips off in large blotches. When thoroughly dry the root breaks readily with an abrupt fracture; but when not dry it bends before breaking.

Often the bulk of the drug consists of pieces of stem, usually of smaller diameter than the accompanying pieces of root. In its interior the bark of the root varies from nearly white to dark brown. Old dark-



FIGS. 55-57.—Apocynum cannabinum. Transverse sections: *a*, of root, natural size, dry; *b*, of root, enlarged, by reflected light, after soaking in water; *c*, of root, enlarged, by transmitted light, after removal of cell-contents by caustic lye.

colored bark has plainly visible resin ducts, and sometimes a glistening fracture.

The medullary rays of the wood are continued into the inner bark, and the large vessels in the woody portion are more or less concentrically arranged, while the resin ducts or laticiferous vessels in the bark are scattered.

In illustrating the general appearance of the two drugs, the pieces were purposely selected so as to show the close resemblance between the roots, the only obvious differences being in the relative thicknesses and the color of their barks.

Differences between the root of Apocynum cannabinum and the root of Apocynum androsæmifolium:

ROOT OF A. CANNABINUM.	ROOT OF A. ANDROSÆMIFOLIUM.
Diameter generally averages seven millimeters ($\frac{7}{25}$ inch).	Diameter generally averages about four millimeters ($\frac{1}{6}$ inch), although pieces as small and as large as any of Apocynum cannabinum are found.

Root of A. cannabinum.	Root of A. androsæmifolium.
Thickness of bark about one-fourth the entire diameter of the dried root.	Thickness of bark about one-sixth the entire diameter of the dried root.
Has coarse, but blunt or smooth wrinkles.	Has sharp, rough wrinkles.
External color ash-gray.	External color rusty red-brown.
Vessels in the woody portion more numerous relative to the diameter of the wood, and arranged more or less concentrically.	Vessels less numerous and nearly all in one circle near the outer edge of the wood, only a few being scattered within that circle.

The stems of both plants closely resemble each other, but the stem of Apocynum androsæmifolium is more frequently split longitudinally. Both stems resemble in color the root of Apocynum androsæmifolium; and this has led to the prevailing confusion between the drugs.

Samples of *Euphorbia ipecacuanha* in our possession contain pieces of roots and stems which resemble the roots and stems of Apocynum androsæmifolium, but have a more fibrous and tough wood.

Constituents.—Bitter extractive, resin, tannin, etc.

Nomenclature.—In the Pharmacopœia of 1870 the name "Indian Hemp" was unfortunately given to "Apocynum cannabinum," probably by some oversight. The drug is very generally called "Black Indian Hemp." The name "Indian Hemp" belongs to *Cannabis indica* alone, and should not be applied to Apocynum cannabinum. We have before us several drug lists and fluid extract lists on which appear "Indian Hemp," "Indian Hemp, Foreign," "Indian Hemp, White," and "Indian Hemp, Black." We have not found the name "Canadian Hemp" on any price list. On the other hand, we recently received a parcel of roots and stems of Apocynum cannabinum labelled "Cannabis Indica," sent us in response to a request for the last-named drug. This case furnishes an illustration in point of the necessity of substituting the botanical names—generic or specific, or both—for the vernacular English names, as has been done to a considerable extent in the new Pharmacopœia.

Medicinal Uses.—Apocynum cannabinum is a powerful emetic and hydragogue cathartic. In emetic doses it produces general relaxation of the emunctories, and diaphoresis or diuresis generally occurs. It is used in *dropsies* to remove accumulations of fluid. In small doses it is alterative and tonic.

Dose.—The dose as a diaphoretic is 0.30 gram (5 grains); as an emetic, 1 to 1.30 gram (15 to 20 grains). It is best administered in the form of fluid extract.

APOCYNI CANNABINI EXTRACTUM.

EXTRACT OF APOCYNUM CANNABINUM.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Dose.—0.05 to 0.5 gram (1 to 10 grains) two or three times a day.

APOCYNI CANNABINI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF APOCYNUM CANNABINUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use a mixture of alcohol and water in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol, and one hundred grams (about 3⅓ fluidounces) water.

For suggestions as to details, see page 451.

Dose.—0.20 to two cubic centimeters (3 to 30 minims).

Apocynum Androsæmifolium.

APOCYNUM ANDROSÆMIFOLIUM.

Apocyni Androsæmifolii Radix—Bitter Root; Dogsbane.

Origin.—*Apocynum androsæmifolium*, Linné (*Apocynaceæ*).

Habitat.—North America.

Part used.—The root.

Description.—Pieces of various lengths, rarely exceeding three or four inches, and of from three millimeters (⅛ inch) to twelve millimeters (½ inch) in diameter, the diameter of the largest proportion of pieces being about four (or five) millimeters (⅙ inch); rusty reddish-brown externally, with rough, sharp wrinkles running lengthwise, and deep, sometimes gaping, transverse fissures, through which the white wood is exposed. The thickness of the bark is about one-sixth the entire diameter of the dried root. The wood is porous,

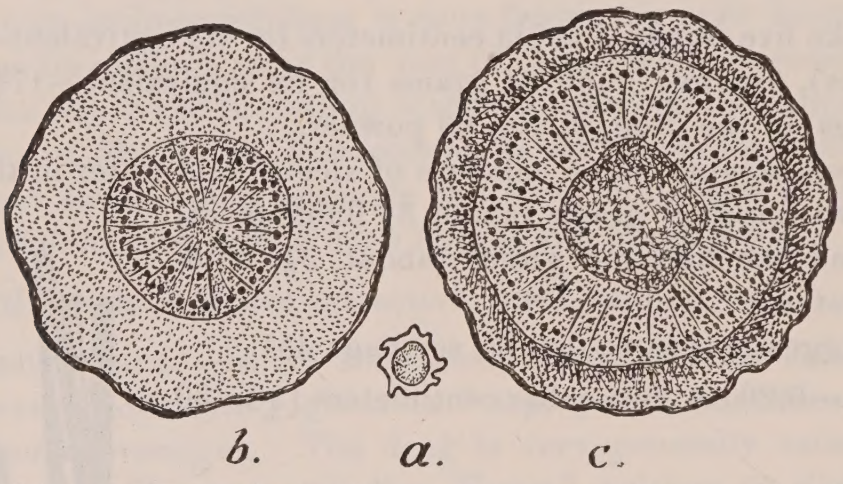
FIGS. 58, 59.—Apocynum androsæmifolium. *a*, stem, natural size; *, undeveloped buds; *b*, root, natural size.

brittle, and gives a short, even fracture. Odor, none; taste, very bitter.

The drug is usually mixed with pieces of the stem of the same plant, which may be distinguished from the root by their buds and pith, both of which are absent in the root.

True Apocynum androsæmifolium (root) is not readily obtained in the market.

Euphorbia ipecacuanha has been mistaken for Apocynum androsæmifolium, which it somewhat resembles. The woody portion of the root (and stem) of Euphorbia ipecacuanha is stringy and tough, which is



FIGS. 60–62.—Apocynum androsæmifolium. Transverse sections: *a*, of root, natural size, dry; *b*, of root, enlarged, by reflected light, after soaking in water; *c*, of stem, enlarged, by reflected light, after soaking in water.

rarely the case in the root of Apocynum androsæmifolium, only a few pieces of old root having been found to contain a fibrous wood.

See also article on Apocynum cannabinum.

Constituents.—Bitter principle and resin.

Medicinal Uses.—Emetic, diaphoretic, and laxative; in small doses alterative and tonic. Useful in *hepatic derangements* with constipation, *dyspepsia*, and *amenorrhœa*.

It is probable that the effects of Apocynum androsæmifolium and Apocynum cannabinum are very nearly alike, if not identically the same, so that a careful differential diagnosis between the two roots is of importance only because of the absolute necessity in medicine of calling each several drug by its own proper name, without which no reliable knowledge of pharmaco-dynamics can exist.

Dose.—As an alterative and tonic, one gram (15 grains) during the day; as a laxative, one to two grams (15 to 30 grains); and as an emetic, 2.5 to five grams (40 to 75 grains).

APOCYNI ANDROSÆMIFOLII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF APOCYNUM ANDROSÆMIFOLIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use a mixture of alcohol and water in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol, and one hundred grams (about $3\frac{1}{3}$ fluidounces) water.

For suggestions as to details, see page 451.

Dose.—0.50 to two cubic centimeters (8 to 30 minims).

Apomorphinæ Hydrochloras; U. S.

HYDROCHLORATE OF APOMORPHINE.

Description.—See the Pharmacopœia, page 40. Apomorphine is an artificial alkaloid prepared from morphine. The hydrochlorate ("muriate") keeps better than the alkaloid itself. It is, however, spoiled by exposure to light, and hence the Pharmacopœia directs that it be kept in a dark place. Exposure to air is also deleterious, and it is therefore best to keep the preparation in small vials.

It is soluble in 6.8 parts water.

Medicinal Uses.—This is a prompt emetic, the use of which is not without danger, as it may produce collapse. It is indicated in cases of *poisoning*, *over-loaded stomach*, *impaction of food* in the œsophagus, etc.

Dose.—For adults, 0.002 to 0.004 gram ($\frac{1}{30}$ to $\frac{1}{16}$ grain) by hypodermic injection; 0.008 gram ($\frac{1}{8}$ grain) by mouth.

Aqua; U. S.

WATER.

"Natural water in its purest attainable state." See the Pharmacopœia, page 40.

Must be colorless, clear, odorless, and tasteless; it must not contain more than one part fixed impurities in ten thousand parts (about 1 grain in 22 U. S. fluidounces); and not more than traces of organic matter.

Water is the most important article of the whole materia medica list. It is also the most important solvent in the household economy, and in the arts and manufactures. In pharmacy and chemistry it is indispensable.

Melted *ice* gives a very pure water. *Rain water*, collected in clean

vessels as it falls from the clouds (not from roofs) after it has been raining awhile, is also very pure water.

River water is usually comparatively pure, and being generally free from calcium and magnesium salts, is called *soft water*. It may, however, and frequently does, contain both these and other impurities, especially organic matters. Although containing no unwholesome impurities, the water may be so unclear from the matters dissolved or held in suspension in it as to be entirely unfit for any chemical or pharmacal purposes.

The Mississippi River water is not a bad drinking water, but it is never clear, and at times very muddy. It cannot be made clear except by very careful and troublesome filtration.

Spring water is usually *hard water*, *i.e.*, it contains calcium and magnesium salts, which produce insoluble compounds with soap. By boiling, hard water can be made less hard, because most of the calcium and magnesium carbonates will deposit so soon as the free carbonic acid is driven off by the heat.

Well water is most liable to be impure, especially in thickly inhabited towns. Sewage, and organic matter from the air and soil, are constantly washed into the wells. Well water thus contains ammonia.

Alum purifies water by decomposition with the ammonia contained in it, whereby also a mechanical clarification results through the precipitation of the hydrate of aluminium, which carries much of the organic matters with it in settling.

Water containing much organic matter putrefies on standing.

Gums, sugar, mucilage, and numerous salts are soluble in water. Starch is also taken up by boiling water, but not in perfect solution. Resins, volatile oils, fixed oils, and alkaloids, which are the most important constituents of organic drugs, are comparatively insoluble in water. A partial solution of these substances is however effected when the crude drugs are macerated, digested, or boiled with water, owing to the fact that the presence of the extractive matter, etc., contributes to their solution.

Aquæ Aromaticæ.

Aromatic Waters.

Distilled aromatic waters are the finest. Rose water and orange-flower water are, however, the only aromatic waters of the present Pharmacopœia which are directed to be prepared by distillation.

In the Pharmacopœia of 1870 most of the aromatic waters were directed to be prepared by triturating the volatile oil with carbonate of

magnesium, and then with the distilled water, after which the whole was thrown on a filter, the filtrate being the finished product. This process was objectionable because the water dissolved an appreciable quantity of magnesium carbonate.

The present Pharmacopœia introduces an entirely new process proposed by Mr. W. S. Thompson, of Washington. By this method two parts of the volatile oil is distributed through four parts of clean carded cotton (absorbent cotton is the best) by adding the volatile oil gradually and picking the cotton apart after each addition. The saturated cotton is then packed in a percolator and distilled water is percolated through it until one thousand parts has been obtained, which constitutes the finished product. The process is excellent, and the products obtained by it are of superior quality. It is well to put a layer of dry loose cotton into the neck of the percolator, and over that a layer of cotton wetted with distilled water, or a layer of dry sand, before introducing the cotton saturated with the volatile oil; and it is also safer to weight the whole down by coarse sand, to prevent it from being pushed up by the water, especially if a conical percolator is used as directed (see Elixir of Orange).

Aromatic waters are seldom used except as vehicles for other and more active medicines.

Aqua Distillata; U. S.

DISTILLED WATER.

See the Pharmacopœia, page 44. A colorless, odorless, tasteless water, which should leave no residue on evaporation.

A distilled water absolutely free from chlorides and sulphates may nevertheless contain ammonia compounds and other gaseous substances of organic origin which impart to it a very perceptible and sometimes a quite disagreeable odor. When carefully prepared as directed by the Pharmacopœia it is pure. Distilled water obtained by condensing the steam from steam boilers in factories is never odorless, and sometimes has a nauseating smell.

Aralia Hispida.

ARALIA HISPIDA.

Araliæ Hispidæ Rhizoma—Dwarf Elder.

Origin.—*Aralia hispida*, Michaux (*Araliaceæ*).

Habitat.—United States.

Part used.—The rhizome.

Description.—Cylindrical pieces, from two to six millimeters ($\frac{1}{12}$ to $\frac{1}{4}$ inch) diameter, not branched, longitudinally wrinkled, marked by the scars of rootlets ; grayish-brown ; odor and taste faintly aromatic.

Fig. 63.—False Sarsaparilla, natural size.

Constituents.—Probably a small amount of volatile oil.

Medicinal Uses.—Said to be diuretic and alterative, and useful in *dropsy*, *gravel*, and other *urinary troubles*.

Dose.—Two to five grams ($\frac{1}{2}$ to 1 drachm), best given in the form of fluid extract.

ARALIÆ HISPIDÆ EXTRACTUM FLUIDUM.

Fluid Extract of Aralia Hispida.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use diluted alcohol. For suggestions as to details, see page 451.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Aralia Nudicaulis.

Aralia Nudicaulis.

Araliæ Nudicaulis Rhizoma—American Sarsaparilla ; False Sarsaparilla.

Origin.—*Aralia nudicaulis*, Linné (*Araliaceæ*).

Habitat.—North America.

Part used.—The rhizome.

Description.—Cylindrical, thirty centimeters (12 inches) or more in length, but usually broken into shorter pieces, about six millimeters ($\frac{1}{4}$ inch) thick, longitudinally wrinkled, annulate above, with cup-shaped scars from stems; rootlets few or absent; bark grayish-brown, exfoliating ; internally white or pale yellowish ; pith spongy; odor slightly aromatic ; taste insipid, somewhat disagreeable. See Fig. 63.

Constituents.—A little volatile oil, resin, etc.

Medicinal Uses.—Alterative. Employed similarly to sarsaparilla; also in *pulmonary diseases.*

Dose.—Two to five grams (30 to 75 grains). Best administered in the form of fluid extract.

ARALIÆ NUDICAULIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ARALIA NUDICAULIS.

Prepared in the same manner as the fluid extract of Aralia hispida.

Dose.—Two to five cubic centimeters ($\frac{1}{2}$ to $1\frac{1}{4}$ fluidrachm).

Aralia Racemosa.

ARALIA RACEMOSA.

Araliæ Racemosæ Rhizoma—American Spikenard; Pettymorrel.

Origin.—*Aralia racemosa*, Linné (*Araliaceæ*).

Habitat.—North America.

Part used.—The rhizome.

Description.—Rhizomes ten to fifteen centimeters (4 to 6 inches) long, about twenty-five millimeters (1 inch) thick, and beset with large concave scars from the stems; rootlets many and long. Externally brown; internally whitish. Odor and taste aromatic.

Constituents.—Probably a little volatile oil, resin, etc.

Medicinal Uses.—Similar to those of Aralia nudicaulis. Alterative. Popularly used in *pulmonary affections.*

Dose.—Two to ten grams ($\frac{1}{2}$ to $2\frac{1}{2}$ drachms). Best given as fluid extract.

The bark of *Aralia spinosa* has also been used as an emetico-purgative and alterative. The dose is the same as of A. racemosa.

ARALIÆ RACEMOSÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ARALIA RACEMOSA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol. For suggestions as to details, see page 451.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Araroba.

ARAROBA.

Goa-powder.

A grayish-brown powder deposited in the cavities formed by decay in the wood of one or more unknown Brazilian trees (probably Cæsalpinia echinata, Lamarck). Odorless. Taste bitter. Contains about eighty per cent. of chrysarobin (which see).

Areca.

ARECA NUT.

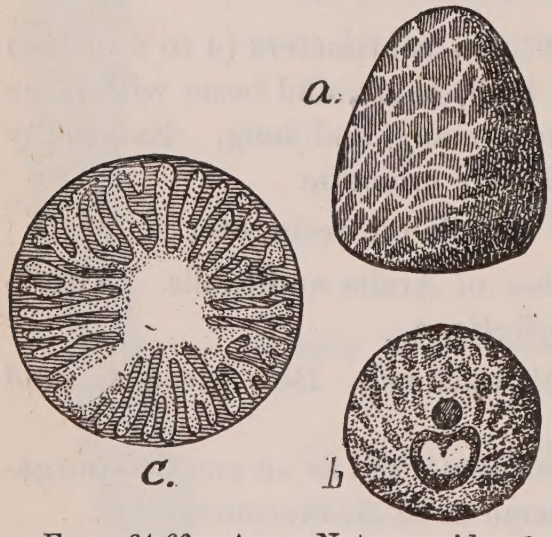
Arecæ Semina—Betel Nut.

Origin.—*Areca Catechu*, Linné.

Habitat.—East Indies.

Part used.—The seed.

Description.—See Figs. 64–66. It is in the shape of a short, rounded cone, scarcely an inch long. The base has a depressed center. The outer coat is brownish and covered with a network of reddish veins which penetrate through it into the albumen of the seed, giving to the areca nuts an appearance resembling that of nutmegs. The seed is heavy, hard, dense, and difficult to cut or break. When freshly broken the fragments have a cheese-like odor. The taste is astringent.



FIGS. 64-66.—Areca Nut. *a*, side; *b*, lower surface; *c*, transverse section, slightly enlarged.

Constituents.—Contains fourteen to fifteen per cent. *tannin*, resembling that of catechu, and about fourteen per cent. of fixed oil, which is crystalline at ordinary temperatures.

Medicinal Uses.—It is an astringent and also an anthelmintic. The charcoal from areca nuts, which has a greater density than ordinary charcoal, is greatly esteemed as a constituent in dentifrices.

Dose.—As an astringent from fifty to one hundred centigrams (8 to 15 grains), and for the expulsion of tænia from fifteen to twenty-five grams, given best in the form of fluid extract.

ARECÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ARECA NUT.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

For suggestions as to details, see page 451.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Argentum.

SILVER.

Silber, G.; *Argent*, F.; *Plata*, Sp.; *Silfver*, Sw.

Soluble in nitric acid; insoluble in hydrochloric acid and in sulphuric acid, and not affected by alkalies. Its salts are generally white or pale yellowish. Nitrate of silver is soluble in water; the other silver compounds are insoluble.

Argenti Cyanidum; U. S.

CYANIDE OF SILVER.

Argenticum Cyanidum, Silver Cyanide.—Argentum Cyanatum—Cyansilber, G.; *Cyanure d'argent*, F.; *Cianuro de Plata*, Sp.; *Silfvercyanid, Cyansilfver*, Sw.

Description.—See the Pharmacopœia, page 46.

Must be kept in dark, amber-colored bottles or in a dark place.

Uses.—Only in the alternate process for making hydrocyanic acid, if that process is ever used.

Argenti Iodidum; U. S.

IODIDE OF SILVER.

Argenticum Iodidum, Silver Iodide—Argentum Iodatum—Jodsilber, G.; *Iodure d'argent*, F.; *Ioduro de Plata*, Sp.; *Jodsilfver, Silfverjodid*, Sw.

Description.—See the Pharmacopœia, page 46. Now officially recognized for the first time.

Preservation.—In amber-colored bottles, to prevent alteration by light.

Uses.—For the same purposes as silver nitrate, but said to be without the danger of discoloration of the skin.

Dose.—From 0.06 to 0.125 gram (1 to 2 grains) three times daily in pill form.

Argenti Nitras; U. S.

NITRATE OF SILVER.

Argenticus Nitras, Silver Nitrate.—Argentum Nitricum; Azotas Argenticus—Salpetersaures Silberoxyd, Silbersalpeter, G.; *Azotate d'argent, Nitre lunaire*, F.; *Nitrato de Plata cristalizado, Nitrato argentico*, Sp.; *Salpetersyrad Silfveroxid*, Sw.

Description and Tests.—See the Pharmacopœia, page 46. It contains no water, unless very small quantities mechanically adhering to or enclosed between and in the clumps of crystals. Darkens by exposure to light, especially when in contact with organic matters.

Granulated nitrate of silver is the purest, is free from water, and is more readily dispensed than larger crystals.

Preservation.—Must be kept in amber-colored bottles or in a dark place.

Solutions should be prepared with distilled water, and dispensed in amber-colored (*not blue*) vials.

Medicinal Uses.—Nitrate of silver is occasionally used internally in *chronic gastric catarrh, chronic dysentery* and *diarrhœa*, etc. It was formerly much used in *epilepsy* and other nervous affections. It appears probable that nitrate of silver given internally is changed into insoluble chloride of silver by the free hydrochloric acid and chlorides of the gastric juice.

If locally applied, nitrate of silver is a superficial escharotic, coagulating albumen and producing a white eschar, which turns dark brown, or nearly black, in the light.

Applied to inflamed mucous membranes, a solution of five to fifteen grains to the ounce of distilled water (0.3 gram in 30 cubic centimeters) often produces a valuable alterative effect, as in *tonsillitis, follicular pharyngitis*, etc. It is also useful in *onychia, paronychia*, and *indolent ulcers*; in various skin diseases, as *eczema* and *pruritus*; in *granular lids* or *chronic conjunctivitis*; or as an injection to abort *gonorrhœa*, or to obliterate the sacs in *cysts, hydrocele, old abscesses*, etc.

Externally it is applied in solid stick or in solutions of various

strength. Accidental spots produced by the solution may be removed by applying strong solution of iodine and then washing with ammonia water.

The **Dose** is one-fourth to one-half grain (0.015 to 0.03 gram), in pill, three times daily. Avoid the use of salt. In poisonous doses nitrate of silver produces gastro-enteritis. As it forms an insoluble chloride with common salt, the latter is the antidote for it.

ARGENTI NITRAS DILUTUS; U. S.

Diluted Nitrate of Silver.

Pure fused nitrate of silver, in sticks, is very brittle. Hence it is dangerous to use it in the throat or in cavities, where it might be broken, and poisoning result from the piece swallowed or remaining in the cavity. Moreover, pure nitrate of silver is in most cases too strong, or unnecessarily strong, and a milder caustic answers as well or better. Hence it has long been customary to use a diluted nitrate of silver. Manufacturers sell several kinds, designated by numbers: No. 1 is one-third nitrate of silver and two-thirds nitrate of potassium; No. 2 is one-fourth nitrate of silver and three-fourths nitrate of potassium; No. 3 is two-ninths nitrate of silver and seven-ninths nitrate of potassium; and No. 4 is one-fifth nitrate of silver, and four-fifths nitrate of potassium. Several pharmacopœias have official formulæ for diluted nitrate of silver, among which may be mentioned the German, Russian, and Scandinavian Pharmacopœias. In the Swedish Pharmacopœia, for instance, we find "Nitras Argenticus Mitigatus," consisting of equal parts of nitrate of silver and nitrate of potassium—the same proportions as now official in the Pharmacopœia of the United States; and also "Nitras Argenticus bis Mitigatus," which consists of one-third nitrate of silver and two-thirds nitrate of potassium, which is the same as the "Argentum Nitricum cum Kali Nitrico" of the German Pharmacopœia, and the Russian "Argentum Nitricum bis Mitigatum."

Must be white, firm, and have the composition prescribed by the U. S. Pharmacopœia, viz., equal parts of nitrate of silver and nitrate of potassium. (See, also, "Argenti Nitras Fusus.")

Keep it in small, amber-colored bottles in a dark place.

Used for external application, like nitrate of silver, but is milder in its action.

ARGENTI NITRAS FUSUS; U. S.

MOULDED NITRATE OF SILVER.

Argenticus Nitras Fusus, Fused Silver Nitrate; Lapis Infernalis—Höllenstein, G.; *Pierre infernale*, F.; *Nitrato argentico fundido, Piedra infernal*, Sp.; *Lapis*, Sw.; *Lunar Caustic.*

Prepared by fusing nitrate of silver and adding one ounce hydrochloric acid for every twenty-five ounces of nitrate of silver. The product will contain about five per cent. of chloride of silver, which imparts a firmness and tenacity to the nitrate of silver which is quite a desideratum in its practical use.

Nitrate of silver for cauterization is conveniently used in the form of sticks or pencils. Usually the sticks are cylindrical, smaller in diameter than an ordinary quill, and about two or three inches long. Sometimes the nitrate of silver is moulded in conical sticks or points about an inch long, suitable for the caustic case, which is undoubtedly most convenient.

Should be white, not brittle, and must be preserved in black or amber-colored bottles, or in a dark place. See the Pharmacopœia, page 47.

It is used for local application.

ARGENTI NITRAS PLUMBATUS.

NITRATE OF SILVER WITH LEAD.

Melt together in a porcelain dish fifteen grams ($\frac{1}{2}$ ounce) of nitrate of lead and eighty-five grams ($2\frac{5}{6}$ ounces) of nitrate of silver, stirring well until the mixed and melted mass flows smoothly. Then pour it into suitable moulds.

This caustic is recommended as preferable to pure nitrate of silver on the ground of greater cohesiveness. The stick can be sharpened down to a point like a lead-pencil, making it very convenient and safe.

Argenti Oxidum; U. S.

OXIDE OF SILVER.

Argenticum Oxidum, Silver Oxide.—Argentum Oxydatum—Silberoxyd, G.; *Oxyde d'argent*, F.; *Oxido argentico, Oxido de Plata*, Sp.; *Silfveroxid*, Sw.

Description and Tests.—See the Pharmacopœia, page 48.

An olive-brown or brownish-black powder, nearly insoluble in water,

though sufficiently soluble to impart an alkaline reaction to it. It has a metallic taste. Exposure to light causes its reduction to metallic silver. It easily parts with its oxygen. Contact with organic matters reduces the oxide. Even moderate heat alone splits it up into metal and oxygen. With easily oxidizable substances it is, therefore, liable to cause explosions. With ammonia it forms a very violently explosive compound (fulminating silver).

Must be kept in dark, amber-colored vials in a dark and cool place.

Medicinal Uses.—Oxide of silver is recommended by Bartholow in *gastralgia* after the ingestion of food, the digestion being good; also in *chronic gastric catarrh* with *pain, pyrosis, eructation of food* with sour matters. It may be combined with equal quantities of extract of hyoscyamus. It is also valuable in *ulcer of the stomach.*

Dose.—One-half to two grains (0.03 to 0.125 gram) in the form of pills.

Armoracia.

HORSERADISH ROOT.

Armoraciæ Radix.

Origin.—*Cochlearia Armoracia*, Linné (*Cruciferæ*).

Habitat.—Cultivated.

Description.—Familiar garden product.

Constituents.—Contains a volatile oil of the same composition as volatile oil of mustard, and also some bitter resin and salts. The volatile oil is formed in a manner analogous to that by which the volatile oil of mustard is formed; it is light yellowish when fresh, but darkens by age.

Medicinal Uses.—A common article of diet, used as a condiment. It is stimulant, stomachic, diuretic, and anti-scorbutic. It is used in scurvy, dyspepsia, etc. Externally it is counter-irritant and rubefacient.

Dose.—Five to twenty-five grams (1 to 6 drachms) several times a day.

ARMORACIÆ SPIRITUS COMPOSITUS; B.

COMPOUND SPIRIT OF HORSERADISH.

Mix sixty grams (2 ounces) fresh, grated and sliced horseradish; sixty grams (2 ounces) bitter orange peel, cut small and bruised; 1.50 gram (25 grains) nutmeg, bruised; four hundred and eighty cubic centimeters (16 fluidounces) proof spirit, and one hundred and twenty cubic

centimeters (4 fluidounces) water, in a suitable still, and distil off four hundred and eighty cubic centimeters (16 fluidounces).

A colorless, spirituous liquid, of pungent, aromatic odor and taste.

Dose.—Five to fifteen cubic centimeters (1 to 3 fluidrachms).

Arnicæ Flores; U. S.

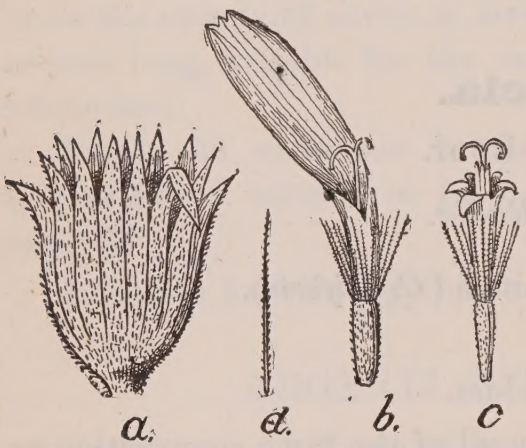
ARNICA FLOWERS.

Wohlverleihblüthen, Arnikablüthen, G.; *Fleurs d'arnique*, F.; *Arnica*, Sp.; *Hästfibleblommor*, Sw.

Origin.—*Arnica montana*, Linné (*Compositæ*).

Habitat.—Europe and North America.

Description.—See the Pharmacopœia, page 48; also Figs. 67–70. Consists of the young flowers collected before the fruit begins to form. Must be of a bright yellow color from the florets. Should not be grayish-hairy from pappus, and must be free from insects. The powder causes sneezing. The drug has a faint aromatic odor, but a bitter acrid taste.



FIGS. 67–70.—Arnica Flowers. *a*, involucre; *b*, ray floret; *c*, disk floret; *d*, hair from pappus; all natural size.

For chemical constituents see Arnicæ Radix.

Medicinal Uses.—Seldom, if ever, given internally. It has been said to be of use in *typhoid conditions, intermittent fever, paralyses*, etc. Externally it is very often used as an application to *bruises, contusions*, etc., but occasionally produces irritation of the skin. Dose of the flowers for internal use, 0.5 to 1.5 gram (10 to 20 grains), best given in the form of fluid extract.

ARNICÆ FLORUM EXTRACTUM.

EXTRACT OF ARNICA FLOWERS.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown. Yield about thirty per cent. Was official in the Pharmacopœia of 1870, but is now dropped, the extract of the root having taken its place.

Dose.—0.2 to 0.3 gram (3 to 5 grains).

ARNICÆ FLORUM EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ARNICA FLOWERS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

For suggestions as to details, see page 451.

Dose.—0.25 to 1.5 cubic centimeter (5 to 20 minims).

ARNICÆ FLORUM TINCTURA; U. S.

TINCTURE OF ARNICA FLOWERS.

This is the "Tincture of Arnica" of the old Pharmacopœia (1870), but is about fifteen per cent. weaker.

It is prepared by macerating one hundred grams (3 ounces 230 grains) arnica flowers in No. 20 powder, with two hundred grams (7 fluidounces) diluted alcohol for twenty-four hours, and then packing the macerated drug firmly into a cylindrical percolator, and percolating with a sufficient quantity of diluted alcohol to obtain five hundred grams (or 18 fluidounces) of tincture.

Medicinal Uses.—This is the form in which arnica is popularly employed for external use.

Dose for internal use, one to three cubic centimeters (15 to 45 minims).

Arnicæ Radix; U. S.

ARNICA ROOT.

Wohlverleihwurzel, Arnikawurzel, G.; *Racine d'arnique*, F.; *Raiz de Arnica*, Sp.; *Hästfiblerot*, Sw.

Origin.—*Arnica montana*, Linné (*Compositæ*).

Habitat.—Europe and North America.

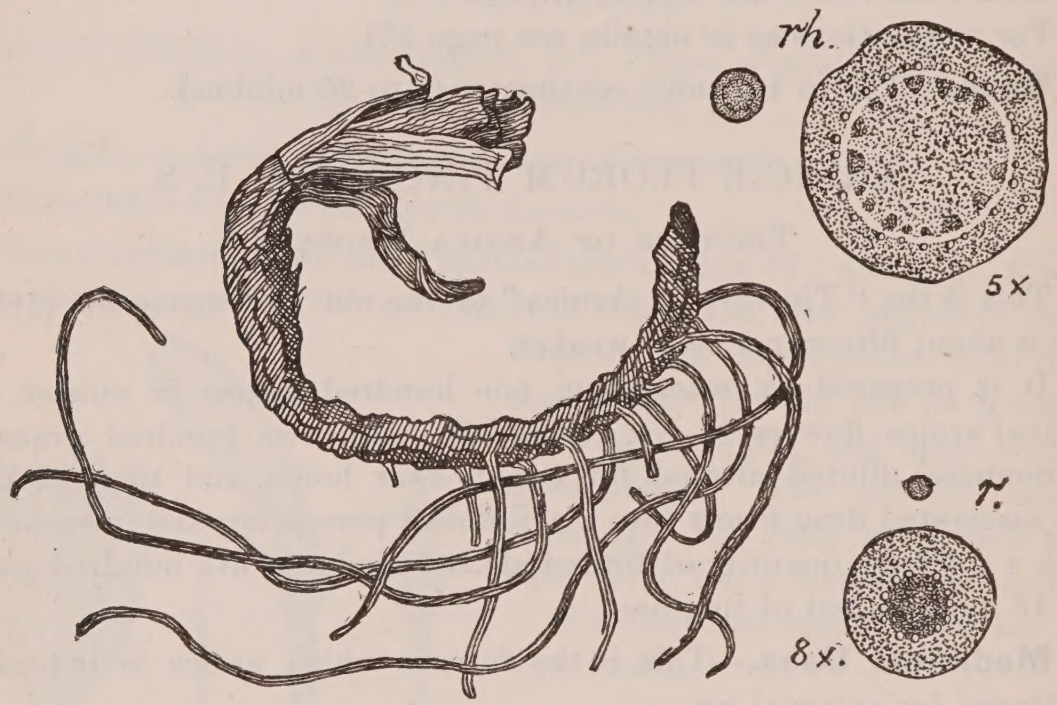
Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 48; also Figs. 71–75.

A transverse section of arnica root shows plainly four strata, viz., outer bark, middle bark, wood, and pith. The middle bark is much thicker than the brown outer bark, and consists of white parenchyma, containing interiorly a circle of resin cells. The odor is faintly aromatic; the taste pungent, aromatic, and bitter.

Constituents.—Those of arnica flowers and arnica root are simi-

lar. They both contain volatile oil, arnicin, acrid resin, and tannin. The root contains more volatile oil than the flowers, but less arnicin. The volatile oil of the root is yellowish, soluble in twice its weight of diluted alcohol, and is found to the extent of one to one and a half per cent.; whereas the volatile oil of the flowers is yellowish or brownish-green, and requires one hundred times its weight of diluted alcohol to



FIGS. 71-75.—Arnica Root, natural size. *rh*, transverse section of rhizome, natural size and enlarged; *r*, ditto of rootlets.

dissolve it. The two volatile oils are therefore different. *Arnicin* is not sufficiently investigated. The name is variously applied to a resinous principle or mixture, and to a substance having the properties of an alkaloid.

Arnica root, being less bulky, is easier to handle in making pharmaceutical preparations.

Medicinal Uses.—Similar to those of the flowers.

Dose.—0.5 to 1.5 gram (10 to 20 grains).

ARNICÆ EMPLASTRUM; U. S.

Arnica Plaster.

Melt one hundred grams (3 ounces 230 grains) resin plaster, and then incorporate with it fifty grams (1 ounce 334 grains) solid extract of arnica root.

The substitution of extract of arnica root for the extract of arnica

flowers used in the Pharmacopœia of 1870 is a pharmaceutical improvement. The proportions are the same.

Uses.—This is a popular plaster, used as a "strengthening plaster," in *weak back*, *local pains*, etc.

ARNICÆ RADICIS EXTRACTUM; U. S.

Extract of Arnica Root.

From five hundred grams (or 17⅔ avoirdupois ounces) of the drug, in No. 60 powder. Use diluted alcohol. Moisten with two hundred grams (7½ fluidounces). Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate to exhaustion, or until one thousand five hundred grams (about 56 fluidounces) is obtained. Distil off the alcohol. Evaporate the remainder to a solid extract and incorporate with it one-twentieth of its weight of glycerin. It is dark brown.

Now for the first time introduced in the U. S. Pharmacopœia, taking the place of the "Extract of Arnica" from the flowers, formerly official.

Used for preparing the plaster.

ARNICÆ RADICIS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Arnica Root.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.3 to 1.5 cubic centimeter (5 to 20 minims).

ARNICÆ RADICIS TINCTURA; U. S.

TINCTURE OF ARNICA ROOT.

Macerate fifty grams (1 ounce 334 grains) arnica root, in No. 40 powder, for twenty-four hours with fifty grams (or 2 fluidounces) diluted alcohol; then pack it firmly into a cylindrical percolator, and with a sufficiency of diluted alcohol percolate five hundred grams (or 18 fluidounces) of tincture.

New to the U. S. Pharmacopœia. It is only half the strength of the tincture of arnica flowers.

Dose.—Two to six cubic centimeters ($\frac{1}{2}$ to $1\frac{1}{2}$ fluidrachm).

Arnotta.

ARNOTTA.

Orellana, Orleana, Annatto.

A pasty, or hard, red coloring matter from the seeds of Bixa orellana, Linné.

It is nearly insoluble in water, which it simply colors yellow. Odor peculiar, cheesy. Taste bitter, saline.

It dissolves almost completely in alcohol, ether, oils, and alkalies, with an orange-red or dark-red color, and is used on this account as a coloring agent for pomades, butter, cheese, etc.

Aromaticus Pulvis; U. S.

AROMATIC POWDER.

Triturate fifteen grams (230 grains) crushed cardamom seeds, without the capsules, and fifteen grams (230 grains) nutmeg, in No. 20 powder, with twenty grams (309 grains) cinnamon, in No. 60 powder, until all is reduced to a fine powder. Then add fifteen grams (230 grains) more of the cinnamon, and thirty-five grams (1 ounce 103 grains) ginger, both in No. 60 powder, and mix intimately.

The manipulations are an improvement on the working formula in the old Pharmacopœia, which prescribed fine powders of all the constituents to be mixed, which cannot be effected without loss of the volatile oils in the drying necessary before the cardamom seeds and nutmeg can be reduced to No. 60 powder separately.

Medicinal Uses.—Mainly as an aromatic excipient for the administration of disagreeable substances. Useful also as a stimulant carminative.

Dose.—0.2 to 0.5 gram (3 to 10 grains).

AROMATICA CONFECTIO.

AROMATIC CONFECTION.

Mix aromatic powder thoroughly with an equal weight of honey, or a sufficient quantity to form a stiff paste. Was official in 1870, but dropped from the new Pharmacopœia. Used as a pill excipient.

AROMATICUM EXTRACTUM FLUIDUM; U. S.

AROMATIC FLUID EXTRACT.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of aromatic powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and seventy-five grams (about 7⅓ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Arsenium.

ARSENIC.

Arsenum.—Arsenicum—Arsenik, G. and Sw.; *Arsenic*, F.; *Fly-stone, Cobaltum, Metallic Arsenic.*

A dull, steel-gray metal, in more or less well-developed crystals of a rather dull metallic appearance. It slowly oxidizes in water to arsenious acid, and hence cobaltum is used as a fly-poison.

Arseniosum Acidum; U. S.

ARSENIOUS ACID.

Arseniosum Oxidum, Arsenious Oxide; Acidum Arsenicosum, Arsenicum Album—Arsenige Säure, Weisser Arsenik, G.; *Acide arsénieux, Arsenic blanc, Fleurs d'Arsenic*, F.; *Acido arsenioso, Arsenico blanco*, Sp.; *Arsenik, Arseniksyrlighet, Hvit Arsenik*, Sw.; *Arsenic, White Arsenic, Arsenious Anhydride.*

Description and Tests.—See the Pharmacopœia, pages 10 and 11. When recently prepared the arsenious acid is transparent like glass. As it generally occurs in the trade, however, it consists of quite white and opaque solid masses, less transparent than china, but more shining than porcelain. Glassy in the fracture. The powder has a dead, white color. The opaque arsenious acid is more soluble in water than the glassy transparent form. A solution of opaque arsenious acid made with boiling water will contain over ten per cent., but on cooling only 2.9 per cent of the arsenic remains in solution. It dissolves more freely in acids, especially in hydrochloric acid.

The commercial powdered arsenic is generally quite impure. Arsenious acid in lumps is easily powdered by trituration in a Wedgewood mortar. To avoid the poisonous dust arising during the operation the arsenious acid should be kept moistened with alcohol.

Medicinal Uses.—Arsenious acid and its soluble salts are violent poisons and must be used with caution.

Arsenic is sometimes used to improve the complexion and general appearance and condition. A tolerance for this substance may be established which will permit the habitual arsenic-eater to take daily doses that would prove fatal to one not accustomed to the poison, but the number of deaths from this pernicious abuse of arsenic is not inconsiderable. In small doses given for some time arsenic is a stimulant tonic, increasing the digestion and improving the tone of the system. Its tonic effects are permanent.

It is also a valuable stomachic, proving of marked benefit in all cases of *gastric irritation* accompanied by vomiting, or even in many cases unaccompanied by the latter symptom, as in *ulcer* or *cancer* of the stomach, *gastralgia, dyspepsia*, or the "*morning sickness*" or vomiting of pregnancy.

The *morning nausea* or vomiting of old topers often yields promptly to two- or three-drop doses of Fowler's solution three times daily. The same is true of that form of *diarrhœa* consisting mainly of the evacuation of undigested food, or of that form of *dyspepsia* or *indigestion* in which an urgent desire to go to stool is felt immediately after or even

while partaking of food. In these cases one- to three-drop doses of Fowler's solution should be given before meals, in combination with vegetable bitters.

Arsenical preparations possess valuable alterative properties in chronic *intermittent* and *malarial fevers*, and are also useful in preventing the relapses of these affections if given for some weeks after the acute attack has been checked by other medication.

Five-drop doses of Fowler's solution three times daily will be found useful in some *skin diseases*, and especially in those chronic forms of a scaly or scabby nature and of non-syphilitic origin.

Arsenic is of no use in syphilitic skin diseases. This remedy has also proved valuable in various nervous affections, such as *epilepsy*, *chorea*, etc.

The **dose** of arsenious acid is 0.002 to 0.005 gram ($\frac{1}{30}$ to $\frac{1}{12}$ grain). Children bear the remedy well and in comparatively large doses.

Poisonous Effects.—In poisonous doses arsenic produces symptoms of gastro-intestinal irritation or of cerebral oppression. The former symptoms are more frequent, and consist in burning pain in the epigastrium and abdomen, distressing vomiting, dryness in the mouth and fauces, and intense thirst; bloody stools often passed involuntarily; strangury or hæmaturia, or, in females, hemorrhage from the uterus; extreme depression, anxiety, and collapse, and finally death, without previous unconsciousness. In the cerebral form of acute poisoning coma occurs early and suddenly and is soon followed by death.

The quantity capable of producing death varies greatly according to the nature of the patient or other circumstances. If the stomach is full and the dose large, as in most cases of attempted poisoning by the addition of arsenic to the food, absorption will be slow and vomiting prompt, so that most, if not all, of the poison is ejected. An ounce or more has been taken without serious consequences under such circumstances.

If the poison is retained, from 0.125 to 0.25 gram (2 to 4 grains) may prove fatal.

Incompatibles and Antidotes.—Salts of iron, magnesia, and lime, and vegetable astringents are incompatible with arsenic, producing comparatively insoluble compounds. None of these compounds are perfectly insoluble, however, and when formed in the stomach or intestines they must be promptly evacuated from the bowels. In a case of poisoning by arsenic the stomach should be promptly emptied by irritant emetics, mustard, alum, sulphates of copper or zinc, or the subcutaneous injection of apomorphia, assisted by copious draughts of warm water.

Hydrated Oxide of Iron with Magnesia of the present Pharmacopœia is the best antidote. (See U. S. Pharmacopœia, 1880, page 163.) Large quantities of this substance, freshly prepared, may be given with the emetics. The stomach may then be thoroughly washed out by means of the stomach-pump, and then the above-mentioned iron preparation may be given in teaspoonful or tablespoonful doses every few minutes. Too much cannot be given, as it is harmless in itself.

Hydrated Oxide of Iron (U. S. Pharmacopœia, 1870) is used in the same manner. If neither of these preparations can be obtained, magnesia, chalk, and lime-water are useful, and oil, milk, eggs, or mucilage may be given in copious draughts, so as to mechanically prevent absorption and irritation. Emetics should follow these remedies.

The irritation of the alimentary canal and the other symptoms must be treated on general principles, and collapse be prevented, if possible, by stimulants and external applications of warmth.

ARSENIOSI ACIDI LIQUOR; U. S.

SOLUTION OF ARSENIOUS ACID.

Liquor Arsenici Chloridi, Pharm., 1870.

Boil three grams (46 grains) arsenious acid, in small fragments (or, better, in powder), with six grams (93 grains) hydrochloric acid and sixty cubic centimeters (2 fluidounces) distilled water, until dissolved. Filter, and add enough distilled water through the filter to make the whole three hundred grams (or 10 fluidounces).

The title "Solution of Chloride of Arsenic" was erroneously given to this preparation in the Pharmacopœia of 1870 (which was almost exactly the same strength). It does not contain "chloride of arsenic," but is a solution of arsenious acid in water acidulated with hydrochloric acid. The proportion of arsenious acid in it is one per cent. by weight.

To make

VALANGIN'S SOLUTION OF ARSENIC

from the official preparation, mix thirty cubic centimeters (1 fluidounce) of the solution of arsenious acid with thirty-eight and one-half cubic centimeters (1 fluidounce and $2\frac{1}{4}$ fluidrachms) of distilled water.

Medicinal Uses.—Similar to those of arsenious acid.

Dose.—0.20 to 0.33 cubic centimeter (3 to 5 minims).

ARSENICAL PASTE FOR DENTISTS' USE.

Mix two grams (30 grains) arsenious acid and one gram (15 grains) morphine sulphate with a sufficient quantity of creasote to form a stiff paste.

This is used to kill dental nerves, a quantity about the size of a pin's head being sufficient for each application, and generally sufficient to render the nerves of a decayed tooth insensible, so as to enable the filling of carious teeth.

ARSENICAL POWDERS.

Five milligrams (about $\frac{1}{8}$ grain) arsenious acid mixed with five centigrams ($\frac{5}{6}$ grain) calomel.

ARSENICAL SOAP.

Mix three hundred and twenty grams (11 ounces 130 grains) arsenious acid, one hundred and twenty grams (4 ounces 100 grains) potassium carbonate, and three hundred and twenty cubic centimeters ($10\frac{1}{2}$ fluidounces) distilled water in a porcelain capsule. When effervescence has ceased boil the liquid until the arsenic is all dissolved. Then add three hundred and twenty grams (11 ounces 130 grains) Castile soap in thin shavings, and, finally, forty grams (1 ounce 180 grains) powdered unslaked lime and ten grams (154 grains) camphor, and mix all intimately.

Arsenii Antidotum.

ANTIDOTE AGAINST ARSENIC.

See "Ferri Oxidum Hydratum cum Magnesia."

Arsenias Sodii; U. S.

ARSENIATE OF SODIUM.

Arsenas Sodicus, Sodium Arsenate.

Description and Tests.—See the Pharmacopœia, page 294.

Used only in the form of the solution—

ARSENIATIS SODII LIQUOR; U. S.

SOLUTION OF ARSENIATE OF SODIUM.

Arsenatis Sodii Solutio.

Dissolve one gram ($15\frac{2}{5}$ grains) arsenate of sodium, from which the water of crystallization has been previously driven off by a heat not exceeding 150° C. (302° F.), in ninety-nine grams ($3\frac{1}{3}$ fluidounces) of distilled water.

Medicinal Uses.—Similar to those of arsenious acid.

Dose.—About 0.20 to 0.40 cubic centimeters (3 to 6 minims).

Arsenii Iodidum; U. S.

Iodide of Arsenic.

Arseniosum Iodidum, Arsenious Iodide.

Description and Tests.—See the Pharmacopœia, page 49.

Must be kept in a glass-stoppered bottle, in a cool place.

Medicinal Uses.—The effects of iodide of arsenic are similar to those of Fowler's solution.

Dose.—0.003 gram ($\frac{1}{20}$ grain) three times a day, and gradually increased until its full effects are noted, as shown by gastric irritation or dryness of the throat.

Arsenii et Hydrargyri Iodidi Liquor; U. S.

Solution of Iodide of Arsenic and Mercury.

Donovan's Solution.

Triturate three grams (46 grains) iodide of arsenic and three grams red iodide of mercury with forty-five grams ($1\frac{1}{2}$ fluidounce) of distilled water until dissolved. Warm water will dissolve the iodides much more rapidly than cold. Filter the liquid and pass enough distilled water through the filter to make the final product three hundred grams (or measure 10 fluidounces). A pale, clear, straw-colored liquid. It contains one per cent., each, of iodide of arsenic and red iodide of mercury.

Medicinal Uses.—This preparation has been given in obstinate skin diseases, both of syphilitic and of non-syphilitic character.

Dose.—0.20 to 0.33 cubic centimeter (3 to 5 minims), diluted and after meals. The dose may be gradually increased as required.

Arsenitis Potassii Liquor; U. S.

Solution of Arsenite of Potassium.

Solutio Potassici Arsenitis, Solution of Potassium Arsenite—Fowler's Solution.

Boil ten grams ($154\frac{1}{3}$ grains) arsenious acid and ten grams bicarbonate of potassium in a chemical flask with one hundred grams ($3\frac{1}{2}$ fluidounces) of distilled water, until all of the arsenious acid shall have been completely dissolved. To aid the solution, use the arsenious acid in powder. (See Acidum Arseniosum.) Then add thirty grams (1 fluidounce) compound spirit of lavender and enough distilled water to make the whole one thousand grams (measuring 34 fluidounces). Set the mixture aside for eight days, and then filter it.

It contains one per cent. arsenious acid, being about fourteen per

cent. stronger than the preparation of 1870. One cubic centimeter (16 minims) of the present preparation contains one centigram (nearly $\frac{1}{6}$ grain) of arsenious acid.

The official preparation is unclear. The preparation can be made beautifully clear by using the corresponding quantities of volatile oils instead of the compound spirit of lavender. To have a clear preparation is of material value, because a badly made solution may contain undissolved arsenic hidden by the cloudiness of the liquid.

Medicinal Uses.—Similar to those of arsenious acid.

Dose.—About 0.20 to 0.40 cubic centimeter (3 to 6 minims, containing $\frac{1}{30}$ to $\frac{1}{15}$ grain of arsenious acid).

Artemisia Abrotanum.

ARTEMISIA ABROTANUM.

Southernwood, Old Man.

Origin.—*Artemisia Abrotanum*, Linné (*Compositæ*).

Habitat.—Cultivated.

Part used.—Flowering tops.

Description.—Resembles somewhat the other artemisias, but is at once recognized by its peculiar, agreeable, aromatic odor. Taste bitter.

Constituents.—Volatile oil and a bitter principle.

Medicinal Uses.—Tonic and anthelmintic.

Dose.—One to two grams (15 to 30 grains.)

Artemisia Vulgaris.

ARTEMISIA VULGARIS.

Artemisiæ Vulgaris Radix—Mugwort.

Origin.—*Artemisia vulgaris*, Linné (*Compositæ*).

Habitat.—Europe; naturalized in North America.

Part used.—Root.

Description.—Grayish-brown, scarcely branched, long fibres. The thickness of the bark is about one-half the diameter of the wood. Between the middle and inner layers of bark is a circle of resin ducts, arranged in from three to six groups. Odor aromatic; taste aromatic and bitter.

Contains *volatile oil* and an acrid, bitter *resin.*

Uses.—Tonic; anthelmintic.

Dose.—One to two grams (15 to 30 grains).

Arum Triphyllum.

ARUM TRIPHYLLUM.

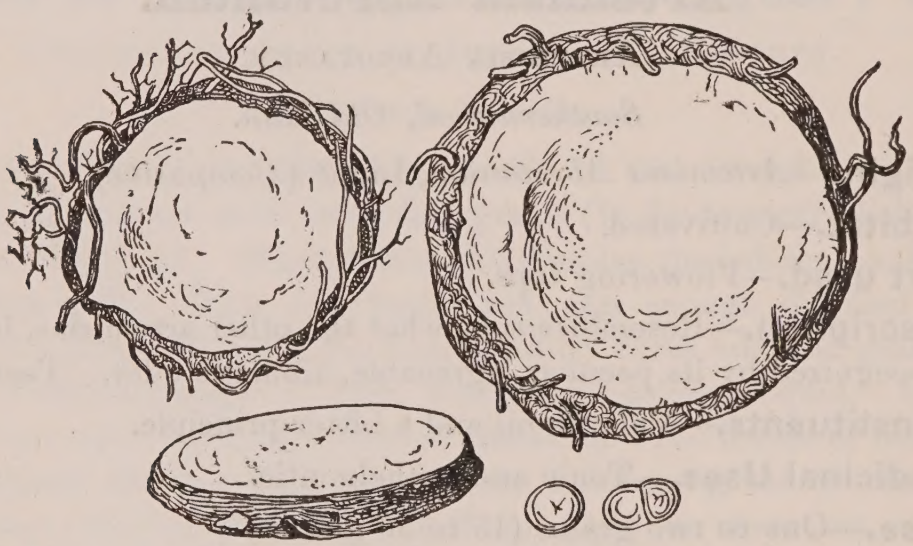
Ari Triphylli Tubera—Indian Turnip.

Origin.—*Arum triphyllum*, Linné (*Araceæ*).

Habitat.—North America.

Part used.—Tubers.

Description.—Occurs in transverse slices from twenty to fifty millimeters ($\frac{3}{4}$ to 2 inches) in diameter, and about three to six millimeters ($\frac{1}{8}$ to $\frac{1}{4}$ inch) thick. The outer edge covered with epidermis is



FIGS. 76, 77.—Arum Triphyllum, natural size. Slices as in drug, and starch enlarged.

dark gray and beset with rootlets. The flat surfaces are white, mealy. Inodorous. Taste acrid.

Constituents.—Contains a volatile acrid principle soluble in ether; also a large quantity of starch, etc. The acrid taste, which is most prominent in fresh tubers, is sometimes wholly lost in the dried drug. Without this acrid burning taste the drug is inert.

EUROPEAN ARUM

(dragon root, Danish ginger) is obtained from *Arum maculatum*, Linné, and is similar to the above.

Medicinal Uses.—Stimulant, expectorant, diaphoretic, and carminative.

Dose of the powdered drug, one to two grams (15 to 30 grains), in mucilage or syrup of acacia, three or four times a day.

ARI TRIPHYLLI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ARUM TRIPHYLLUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a menstruum use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.5 to two cubic centimeters (8 to 30 minims).

Asafœtida; U. S.

ASAFETIDA.

Asafœtida Gummi-Resina—Stinkasant, Teufelsdreck, G.; *Ase fétide*, F.; *Asafétida*, Sp.; *Dyfvelsträck, Assafetida*, Sw.

Origin.—*Ferula Narthex*, Boissier, and *Ferula Scorodosma*, Bentham and Hooker (*Umbelliferæ*).

Habitat.—Persia, and other countries on the Arabian Sea.

Description.—See the Pharmacopœia, page 49. Asafetida is to be found of various grades of purity and quality. The principal distinction is between *tears* and *masses*. "Asafœtida in tears" is almost always good; that in masses may be either good or very bad.

The finest asafetida is firm (neither hard and dry, nor sticky and soft); free from admixtures of bark or other foreign substances; externally yellowish-brown; internally milk-white when freshly broken, but changing gradually to yellow, pink, purplish-red, or brown; has a strong, peculiar, garlicky odor and bitter taste, and yields a rich milk-white emulsion when triturated with water.

Tears are usually preferred. These have a milk-white fracture, and the color of the freshly fractured surface does not generally turn pink until after several hours, or it only turns yellow.

Asafetida in masses is the most plentiful. Sometimes it is very fine, consisting of white "almonds" or large tears embedded in a somewhat softer yellowish or brownish mass. When these almonds make up about three-fourths of the whole mass the drug is to be considered good.

Dry, hard, dark brown, dirty, or sticky asafetida, as well as one which shows a brown color in the fresh fracture, should be rejected.

Asafetida can be powdered only in cold. The powdering is facilitated by drying the gum-resin over lime, and the powder retains its pulverulent condition when kept in paper parcels over lime.

The powdered asafetida to be found in the trade is frequently of ex-

tremely poor quality, being made from the refuse after sorting the drug in its whole state. The best evidence of its inferiority is that it will not yield a good white emulsion when triturated with water, and sometimes scarcely makes a milky mixture at all when so treated. Such inferior powdered asafetida is of a dark brown color, drier than it is possible to get the best quality of the drug, has a weaker odor, and does not yield half its weight to alcohol, although even an inferior grade of the drug, consisting largely of sticky, granular, yellowish-brown, resinous matter, with but a small proportion of white tears or almonds, will dissolve more readily in alcohol than the almonds themselves.

Constituents.—The constituents of asafetida are from three to four per cent. volatile oil, from twenty-four to sixty-five per cent. resin, and from twelve to fifty per cent. gum and bassorin. The volatile oil is light yellow, thin, has a penetrating odor, is scarcely at all soluble in water, but readily so in alcohol or ether. It contains sulphur. On exposure to air it is gradually altered in composition and properties. The isolated resin of asafetida is almost odorless, yellowish-white, and turns pink or purple red on exposure to the air. It is stated to consist of two resins, one acid and the other indifferent, both containing sulphur. In the resin are found numerous needle-like crystals of ferulaic acid. This is tasteless, insoluble in cold, but soluble in boiling water.

The present Pharmacopœia requires that at least sixty per cent. of the asafetida should dissolve in alcohol. This rejects a large proportion of the drug now in the market for pharmacopœial uses.

Medicinal Uses.—This drug is used as a nervine and antispasmodic in *convulsions*, *hysteria*, etc. It is most valuable, however, in *flatulent colic*, to promote the expulsion of wind from the bowels. It is given in pill, emulsion, or injection.

Dose.—0.2 to one gram (3 to 15 grains).

ASAFŒTIDÆ EMPLASTRUM; U. S.

Asafetida Plaster.

Put thirty-five grams (540 grains) asafetida and fifteen grams (231 grains) galbanum with one hundred and twenty grams (5 fluidounces) alcohol in a vessel, and digest on a water-bath until the gum-resins are thoroughly disintegrated. Strain while hot, and then evaporate to the consistence of honey Then add thirty-five grams (or $1\frac{1}{6}$ ounce) lead plaster and fifteen grams (or $\frac{1}{2}$ ounce) yellow wax, previously melted together; mix the whole well, and evaporate to the proper consistence.

Almost identical with the preparation of 1870.

Locally stimulant, and perhaps slightly antispasmodic.

ASAFŒTIDÆ ENEMA.

ENEMA OF ASAFETIDA.

Make an emulsion of two grams (30 grains) asafetida with one hundred and twenty cubic centimeters (4 fluidounces) water.

This is nearly one-half the strength of the official Mistura Asafœtidæ.

Antispasmodic and calmative in *flatulent colic* or in *reflex convulsions* of children, caused by the presence of undigested and irritating food in the alimentary canal.

ASAFŒTIDÆ MISTURA; U. S.

ASAFETIDA MIXTURE.

Asafœtidæ Emulsio, Emulsion of Asafœtida—Milk of Asafetida.

Triturate 4 grams (62 grains) asafetida with one hundred cubic centimeters ($3\frac{1}{3}$ fluidounces), water gradually added, until a perfect emulsion is obtained, and then strain.

Dose.—Fifteen to thirty cubic centimeters (4 to 8 fluidrachms).

ASAFŒTIDÆ PILULÆ; U. S.

ASAFETIDA PILLS.

Mix 19.5 grams (300 grains) asafetida and 6.5 grams (100 grains) soap, in fine powder, with enough water to form a pill mass, and divide this into one hundred pills.

Dose.—Two to five pills.

ASAFŒTIDÆ SUPPOSITORIA.

ASAFETIDA SUPPOSITORIES.

Evaporate thirty cubic centimeters (1 fluidounce) tincture of asafetida spontaneously in an evaporating dish until reduced to a thick syrupy liquid. Mix this thoroughly with four grams (60 grains) cacao butter. Finally incorporate with the mixture twenty grams (300 grains) cacao butter. Divide the mass into twelve suppositories.

ASAFŒTIDÆ SYRUPUS COMPOSITUS.

COMPOUND SYRUP OF ASAFETIDA.

Triturate thirty grams (1 ounce) asafetida and sixty grams (2 ounces) magnesium carbonate with five hundred grams (17 fluidounces) infusion of wild cherry, gradually added, until thoroughly mixed. Fil-

ter, adding enough infusion of wild cherry, through the filter, to make the filtrate measure five hundred cubic centimeters (17 fluidounces). To this add seven hundred and fifty grams (26½ ounces) sugar, dissolve it without heat, and strain. Finally, add enough simple syrup to make the final product measure one thousand cubic centimeters (34 fluidounces).

The disagreeable odor and taste of asafetida are well masked in this preparation.

Dose.—A teaspoonful.

ASAFŒTIDÆ TINCTURA; U. S.

ASAFETIDA TINCTURE.

Macerate two hundred grams (7 ounces 24 grains) asafetida for seven days in a closed vessel with eight hundred grams (28 ounces 96 grains) alcohol. Filter through paper, and then add through the filter enough alcohol to make the filtrate weigh one thousand grams (35 ounces 120 grains).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Asarum.

ASARUM.

Asari Radix—Canada Snake Root, Wild Ginger.

Origin.—*Asarum canadense*, Linné (*Aristolochiaceæ*).

Habitat.—North America.

Parts used.—Rhizome and rootlets.

Description.—From seventy-five to one hundred and fifty millimeters (3 to 6 inches) long, and about three millimeters (⅛ inch) thick rhizomes, with thin rootlets about five to eight centimeters (2 or 3 inches) long. The joints are about twelve millimeters (½ inch) or more apart. Externally, dark purplish-brown; internally, whitish. The bark is one-sixth the thickness of the rhizome, and the pith large. The odor is agreeable, aromatic; the taste pungent, bitter.

Constituents.—Contains volatile oil and a pungent resin, both aromatic.

Medicinal Uses.—A spicy stimulant and carminative, used in *flatulent colic* and painful *bowel affections.*

Dose.—Five to ten grams (1 to 2½ drachms), best administered in the form of fluid extract.

ASARI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ASARUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

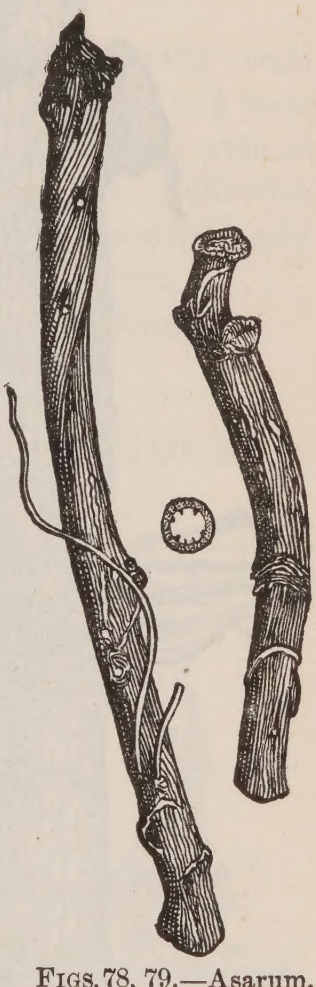
As a menstruum use alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

ASARI SYRUPUS COMPOSITUS.

COMPOUND SYRUP OF ASARUM.

Mix three hundred cubic centimeters (10 fluidounces) alcohol with three hundred cubic centimeters (10 fluidounces) water, and macerate seventy-five grams (2 ounces 350 grains) asarum in coarse powder with the mixture for twenty-four hours. Then strain, transfer the drug to a cylindrical percolator, and percolate the colature through it, returning the percolate until it passes clear. Continue the percolation with water until five hundred cubic centimeters (17 fluidounces) percolate has been received. To this add five grams (75 grains) cochineal, powdered, ten grams (150 grains) carbonate of potassium, forty cubic centimeters (1⅓ fluidounce) wine of ipecac, and seven hundred and fifty grams (26 ounces 200 grains) sugar. Shake the mixture occasionally until the sugar is dissolved. Then strain. Add, finally, enough simple syrup to make the whole measure one thousand cubic centimeters (34 fluidounces). Much used in some sections of this country in cough mixtures.



FIGS. 78, 79.—Asarum. Whole and transverse section, natural size, rather thick specimens.

Dose.—Five cubic centimeters (teaspoonful).

Asclepias; U. S.

ASCLEPIAS.

Asclepiadis Tuberosæ Rhizoma—Pleurisy Root, Butterfly-weed.

Origin.—*Asclepias tuberosa*, Linné (*Asclepiadaceæ*).

Habitat.—United States, along the Atlantic coast.

FIG. 80.—Asclepias tuberosa, natural size.

Part used.—The root.

Description.—See the Pharmacopœia, page 49.

In the Pharmacopœia of 1870 there were three roots derived from different species of asclepias. It is unfortunate that now when only one is official, it should be called simply "Asclepias," without distinction in name from the other two drugs which are still used.

The "Asclepias" of the present Pharmacopœia is known to the trade under the name of "Pleurisy Root." The drug should be sound and white, or yellowish-white (never gray) within.

Constituents.—Two resins, fixed oil, volatile oil, etc. The so-called *asclepidin* is an impure resin.

Medicinal Uses.—Pleurisy root is said to be diaphoretic, expectorant, and carminative, and in large doses emetic and purgative. It has been given in *rheumatism*, *bronchitis*, *flatulent colic*, *pneumonia*, and *pleurisy*.

Dose.—Two to ten grams (30 to 150 grains), best given as fluid extract.

ASCLEPIADIS TUBEROSÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ASCLEPIAS TUBEROSA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a menstruum use alcohol.

Dose.—Two to ten cubic centimeters (½ to 2½ fluidrachms).

Asclepias Cornuti.

ASCLEPIAS CORNUTI.

Asclepiadis Cornuti Rhizoma—Milkweed, Silkweed, Wild Cotton.

Origin.—*Asclepias cornuti*, Decaisne (*Asclepiadaceæ*).

Habitat.—North America.

Part used.—Rhizome.

Description.—Cylindrical pieces, of from ten to twenty centimeters (4 to 8 inches) length, and six to twelve millimeters ($\frac{1}{4}$ to $\frac{1}{2}$ inch) thickness; wrinkled, grayish-brown, somewhat tough; breaks with an abrupt, white fracture; thick bark with laticiferous ducts; yellowish, porous wood; odor, none; taste, bitter, disagreeable, somewhat acrid.

Constituents.—A bitter principle, resin, caoutchouc, etc.

Medicinal Uses.—Similar to those of Asclepias tuberosa.

Dose.—0.5 to 2.5 cubic centimeters (8 to 40 minims).

ASCLEPIADIS CORNUTI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ASCLEPIAS CORNUTI.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a menstruum use alcohol.

Dose.—0.5 to 2.50 cubic centimeters (8 to 40 minims).

Asclepias Incarnata.

ASCLEPIAS INCARNATA.

Asclepiadis Incarnatæ Radix—White Indian Hemp; Flesh-colored Asclepias; Swamp Milkweed.

Origin.—*Asclepias incarnata*, Linné (*Asclepiadaceæ*).

Habitat.—North America.

Part used.—The rhizome and rootlets.

FIG. 81.—Asclepias incarnata, without rootlets; natural size.

Description.—The rhizome is about two centimeters ($\frac{4}{5}$ inch) in diameter, knotty, with a thin, yellowish-brown bark, and hard, white wood. The light brown rootlets are several inches long, and have a thick. white bark. Odor, none; taste, sweetish bitter, acrid.

Constituents.—Said to contain an alkaloid, not described, besides traces of volatile oil and two acrid resins.

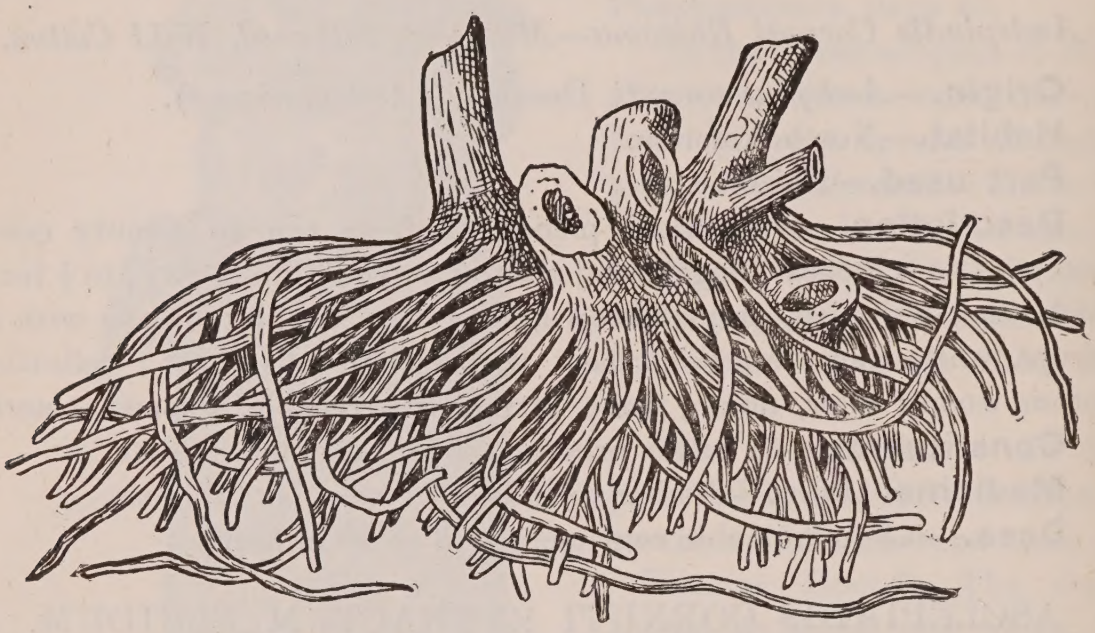


FIG. 82.—Asclepias incarnata ; natural size.

Medicinal Uses.—Alterative, diuretic, and diaphoretic ; in large dose, emetic and cathartic. Said to be also anthelmintic.

Dose.—0.5 to 2.5 grams (8 to 40 grains) ; best given as fluid extract.

ASCLEPIADIS INCARNATÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ASCLEPIAS INCARNATA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a menstruum use alcohol.

Dose.—0.60 to 2.50 cubic centimeters (10 to 40 minims).

Asparagus.

ASPARAGUS.

The young shoots of *Asparagus officinalis*, Linné. Well known article of food.

Constituents.—Contains *asparagin*, which is found in many plant juices, among others in althæa. It is obtained in large colorless crystals.

Medicinal Uses.—Diuretic, in *dropsies.*

ASPARAGI SYRUPUS.

ASPARAGUS SYRUP.

Clarify the fresh juice of the asparagus shoots by heating it to 200° F. and then straining. In three hundred grams (10 ounces) of the filtered colature dissolve five hundred and seventy grams (20 ounces) of sugar.

Dose.—Fifty to one hundred cubic centimeters (1½ to 3 fluidounces).

Aspidium; U. S.

ASPIDIUM.

Aspidii Rhizoma—Filix Mas—Radix Filicis Maris—Wurmfarnwurzel, Waldfarnwurzel, Johanniswurzel, G.; *Rhizome de fougère Mâle*, F.; *Helecho Macho*, Sp.; *Ormbunkerot*, Sw.—*Male Fern; Male Shield Fern.*

Origin.—*Aspidium filix mas*, Swartz; and *Aspidium marginale*, Willdenow (*Filices*).

Habitat.—North America; Northern Europe.

Description.—See the Pharmacopœia, page 50. Collected in August to October. The rhizome should be covered by the closely overlapping bases of the foot-stalks, so that the drug is about double the thickness of the rhizome itself. Externally it is covered with brown scales, from among which the root-fibres protrude.

FIGS. 83–85.—Male Fern. *a*, whole; *b*, stipe unpeeled; *c*, stipe peeled (all natural size).

The rhizome, which is the innermost portion, should be over one-half inch in diameter, spongy, fleshy, easily cut, and distinctly pale green internally.

The powder is greenish when fresh, but soon changes to a brown color and loses its virtues. The taste is at first sweet, afterward astringent, bitter, repulsive; and the odor is disagreeable, heavy, persistent.

There is in the market pared rhizomes of male fern, having a

greenish color when not long kept, which are principally from Aspidium marginale, being smaller than the drug as obtained exclusively from Aspidium filix mas.

A new supply must be obtained every year, and preserved in a tin can with close-fitting cover.

The Pharmacopœia clearly excludes the pared rhizomes. The inert coverings and brown portion must be removed only immediately before the drug is to be prepared for use. It keeps better while covered.

Some specimens of the drug which we have seen consisted entirely of the stipes either "peeled" or "unpeeled." Such a drug is often brown and dry, and as it is not the rhizome at all, should be rejected.

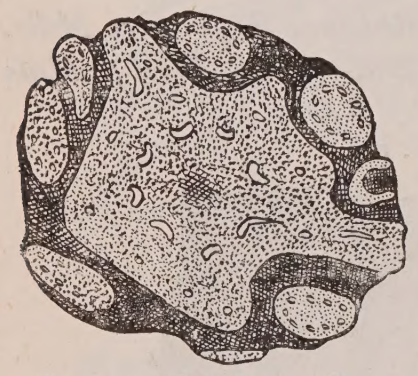


FIG. 86.—Male Fern. Transverse section; natural size.

Constituents.—Aspidium (or male fern) contains nearly seven per cent. of filixolin—a green oil with at first mild, afterward acrid taste. The green color is due to chlorophyll. The drug also contains about four per cent. of resin, a small quantity of volatile oil, and a tannin soluble in diluted alcohol, which colors ferric salts olive green. The most important principle of the drug, however, seems to be *filicic acid*, which has been isolated from the ethereal extract in white crystals of faint odor and taste, insoluble in water, but soluble in boiling alcohol and in ether. The volatile oil possibly aids the filicic acid in the medicinal action.

Medicinal Uses.—Male fern is a valuable tænicide. The bowels should be emptied by a slight laxative, and a light diet only be taken for a day, and then from ten to thirty drops of oleoresin of male fern mixed with four to six grams (60 to 90 grains) of freshly powdered male fern may be given in the morning, fasting; or, preferably, from five to fifteen cubic centimeters (1 to 4 fluidrachms) of the fluid extract may be given instead. These quantities may be given in one dose or in divided doses, and should be followed in a few hours by a purgative. (See also note under title "Granatum.")

ASPIDII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ASPIDIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a menstruum use alcohol.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

ASPIDII OLEORESINA; U. S.

OLEORESIN OF ASPIDIUM.

Filicis Oleoresina—Oleum Filicis Maris—Oil of Male Fern.

Pack two hundred grams (7 ounces 24 grains) aspidium, in No. 60 powder, firmly into a cylindrical glass percolator (furnished with a cover and receptacle for operations with volatile liquids), and gradually pour upon it a sufficient quantity of stronger ether, percolating until three hundred grams (13½ fluidounces) percolate has been obtained. The percolation must be slow. The greater portion of the ether is recovered by distillation on a water-bath, and the remainder is then put into an evaporating dish and allowed to evaporate spontaneously until all the ether has disappeared.

Preservation.—Must be kept in a well-corked bottle. After a time the preparation usually separates into two layers—one a clear, dark green liquid, and the other a light green, granular crystalline sediment. It must be shaken, so as to be thoroughly mixed before dispensing.

(See *Aspidium* for uses and dose.)

Aspidosperma.

ASPIDOSPERMA.

Aspidospermæ Cortex—Quebracho Bark—Quebracho Blanco—True Quebracho Bark—White Quebracho.

Origin.—*Aspidosperma Quebracho*, Schlechtenthal (*Apocynaceæ*).

Habitat.—Brazil.

Part used.—The bark.

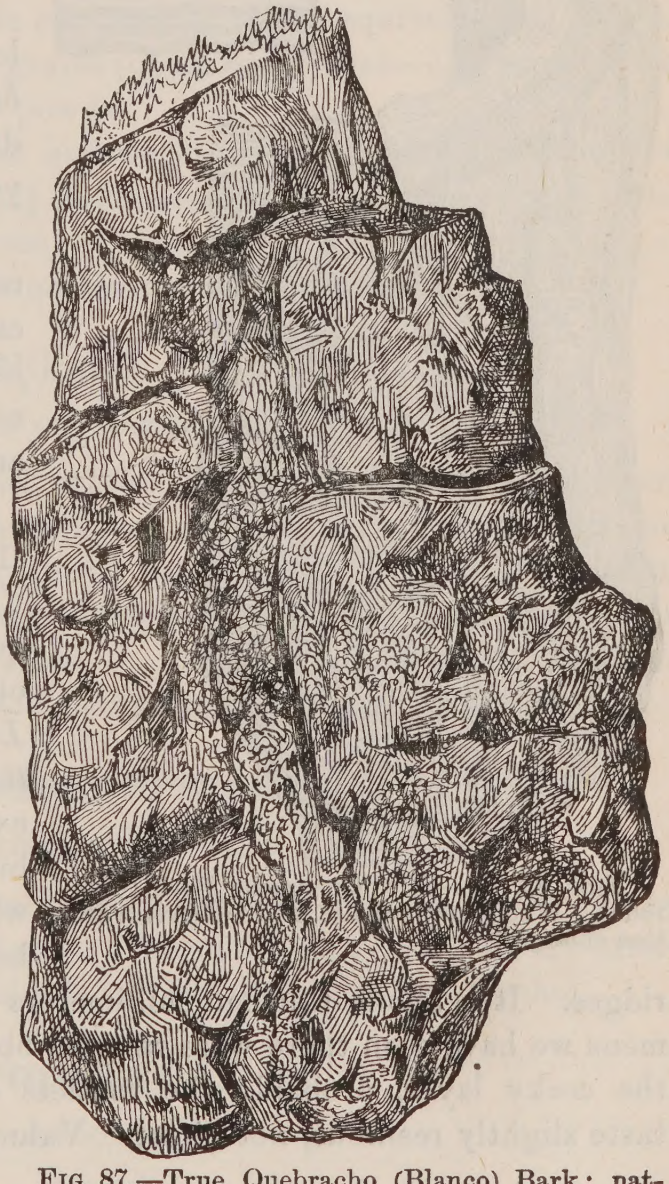
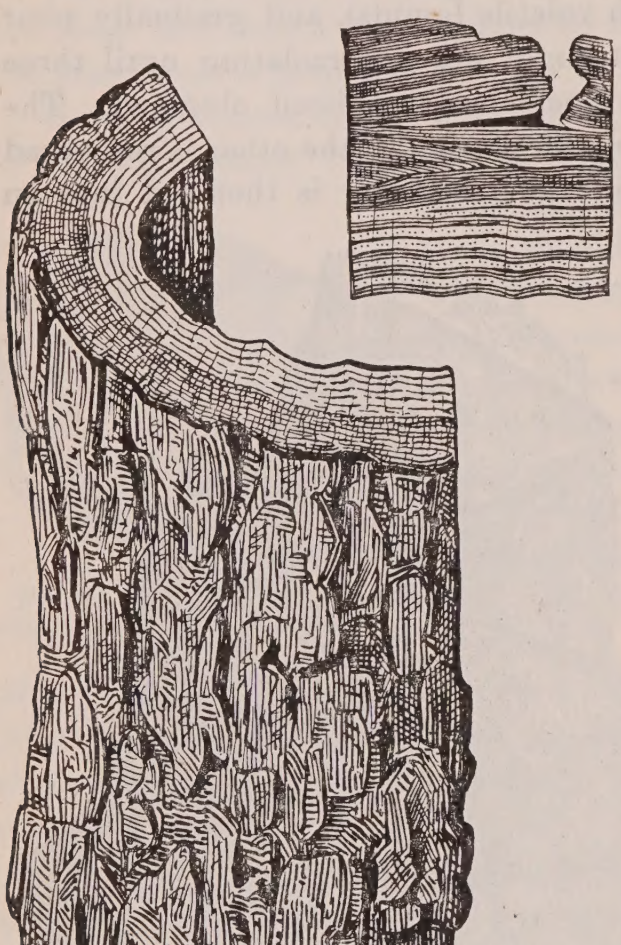


FIG. 87.—True Quebracho (Blanco) Bark; natural size.

Description.—Large pieces, more or less curved, about eighteen millimeters (¾ inch) thick, the rough, corky layer and the inner bark being about of equal thickness. The corky external bark is deeply fis-

sured, both longitudinally and transversely, the longitudinal fissures being wide. In these fissures the bark is grayish from lichenous growths, while the elevations between them are rust-brown. Interiorly the corky layer is rust-brown with dark lines of true cork and minute, whitish spots of bast-cells, indicating that the corky layer is secondary suber. The inner bark is fawn-colored, and marked by fine longitudinal lines on the inner surface, which is otherwise nearly smooth. The fracture is fibrous, irregular. Odorless; corky layer tasteless; inner bark very bitter.



FIGS. 88, 89.—False Quebracho Bark (Colorado). Whole, natural size, and transverse section enlarged.

Constituents.—Two alkaloids, *aspidospermine* and *quebrachine*, have been found in the drug; also other alkaloids not yet described.

Medicinal Uses.—Used to relieve *dyspnœa* from various causes, as from *emphysema*, *phthisis*, *chronic bronchitis*, *asthma*, etc.; also as an antiperiodic and stomachic.

Dose.—0.5 to three grams (10 to 45 grains).

Quebracho Colorado.—Dark quebracho, or false quebracho, is obtained from *Loxopterygium Lorentzii*, Grisebach (*Terebinthaceæ*). It is heavy, dark brown externally, and fissured; light brown on the inner surface, which is marked by a great number of prominent longitudinal ridges. It is about thirteen millimeters ($\frac{1}{2}$ inch) thick. In the specimens we have seen there were tangled fibres all through the fissures of the corky layer, probably the rootlets of some climbers. Odorless; taste slightly resinous, not bitter. Valueless.

ASPIDOSPERMÆ ABSTRACTUM.

Abstract of Aspidosperma.

This preparation may be prepared in the same manner as the official abstracta. We prefer, however, to make it from the fluid extract, one

thousand cubic centimeters (34 fluidounces) yielding five hundred grams (17⅔ avoirdupois ounces) of the finished abstract. (See article "Abstracta.")

This preparation is especially adapted to be carried by the patient who is subject to attacks of *dyspnœa*, and who may in his travels be unable to obtain the remedy otherwise. It is an active and convenient preparation of the drug.

Dose.—0.3 to 1.5 gram (5 to 22 grains).

ASPIDOSPERMÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ASPIDOSPERMA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a menstruum use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3½ fluidounces) of water.

Dose.—One to three cubic centimeters (15 to 45 minims).

ASPIDOSPERMÆ TINCTURA.

TINCTURE OF ASPIDOSPERMA.

This tincture is superfluous, as the fluid extract is much superior. It is used, however, and hence we give a formula for it. It is most conveniently prepared by mixing thirty cubic centimeters (1 fluidounce) fluid extract of quebracho bark with one hundred and twenty cubic centimeters (4 fluidounces) alcohol.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Aspidospermina.

ASPIDOSPERMINE.

One of the alkaloids of quebracho bark. It may be found in the trade in the form of a light brown amorphous powder of a very bitter taste. The pure alkaloid is soluble in fifty parts absolute alcohol.

Atropina; U. S.

ATROPINE.

Atropia.

An alkaloid from belladonna.

Description and Tests.—See the Pharmacopœia, page 50.

A solution of atropine or any of its salts strongly dilates the pupil

when applied to the eye ; but the same effect is produced by daturine, duboisine, hyoscyamine, which are isomeric with atropine.

Must be kept in a well-corked bottle and in a dry place. In damp air it loses its crystalline form, bakes together, becomes discolored, and acquires a tobacco-like odor.

Medicinal Uses.—Atropine may be used whenever belladonna is indicated. It is to be preferred for subcutaneous injection.

Oculists use it for the purpose of dilating the pupils to facilitate examination of the eye, to decrease *intraocular arterial pressure*, and to give relief in *photophobia*, etc.

Dose.—0.0005 to 0.001 gram ($\frac{1}{120}$ to $\frac{1}{60}$ grain).

ATROPINÆ OLEATUM.

OLEATE OF ATROPINE.

Two grams (30 grains) atropine is thoroughly triturated with ninety-eight grams (or 1,470 grains) oleic acid, and the mixture is gently warmed and occasionally stirred until the alkaloid is entirely dissolved.

ATROPINÆ UNGUENTUM.

ATROPINE OINTMENT.

Dissolve two grams (30 grains) atropine in six grams (90 grains) chloroform, and incorporate the solution with ninety-eight grams (1,470 grains) petroleum ointment. Put the mixture into a porcelain capsule and gently warm it, constantly stirring, until the chloroform has evaporated.

Atropinæ Sulphas ; U. S.

ATROPINE SULPHATE.

Atropiæ Sulphas, Phar. 1870.

Description and Tests.—See the Pharmacopœia, page 51.

One drop of a solution of $\frac{1}{10}$ grain of this salt in one hundred grains distilled water should distinctly dilate the pupil when applied to the eye.

The sulphate of atropine contains eighty-five and one-half per cent. atropine.

A solution of one gram (15 grains) atropine sulphate in one hundred grams (1,500 grains) distilled water is official in the British Pharmacopœia under the title of "Liquor Atropiæ Sulphatis."

Aurantii Amari Cortex; U. S.

BITTER ORANGE PEEL.

Pomeranzenschale, G.; *Écorces d'oranges amères, Écorce de bigarade*, F.; *Naranjo Agrio*, Sp.; *Pomeransskal*, Sw.

Origin.—*Citrus vulgaris*, Risso (*Aurantiaceæ*).

Habitat.—Cultivated in Southern Europe.

Part used.—The rind of the fruit.

Description.—See the Pharmacopœia, page 51. Either in spiral bands (or "ribbons") or in quarters; dark brownish-green externally, and covered internally by a thin spongy white layer. The best bitter orange peel is that obtained from the rather small fruit of a variety of orange grown on the Island of Curaçao, in the West Indies. It is called Curaçao orange peel, and has externally a dirty green color. Next in quality is the peel from an orange grown in Southern France, which is said to be green when ripe. Much of the so-called Curaçao orange peel sold in the market is probably not from either of these sources, but from unripe though full-grown oranges grown in Southern Europe.

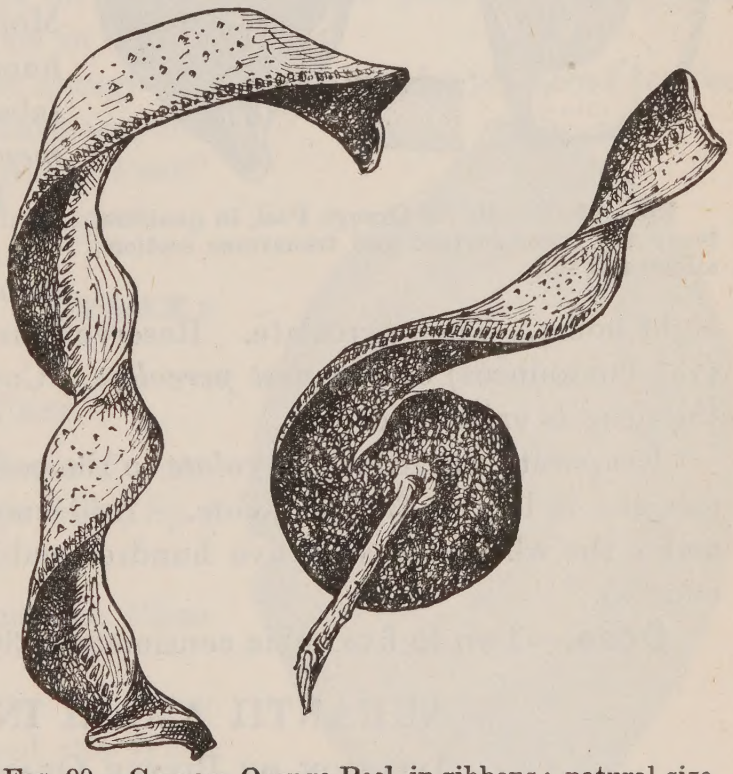


FIG. 90.—Curaçoa Orange Peel, in ribbons; natural size.

Besides the green bitter orange peel, there is also a reddish-brown variety, not as fragrant nor as bitter as the green.

Constituents.—The dry drug contains about one per cent. of volatile oil (about 2½ per cent. is said to be obtained from the fresh orange peel). It also contains a bitter neutral substance called *hesperidin*, which has been isolated in a crystalline form.

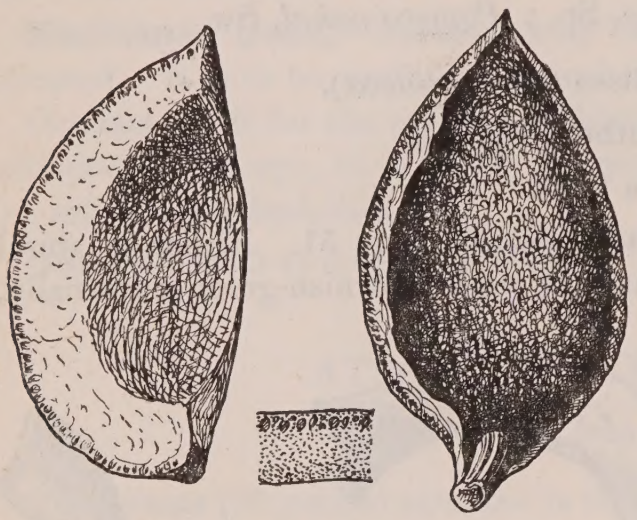
Medicinal Uses.—Stimulant, carminative, and stomachic.

Dose.—Two to five grams (30 to 75 grains).

AURANTII AMARI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Bitter Orange Peel.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.



Figs. 91–93.—Bitter Orange Peel, in quarters, inner and outer surface and transverse section; all natural size.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water. Moisten the drug with one hundred and seventy-five grams (about 7⅔ fluidounces) of the *menstruum.*

Pack it moderately in a conical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate. Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

AURANTII AMARI INFUSUM.

Infusion of Bitter Orange Peel.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). About the same strength as the preparation of the British Pharmacopœia.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

AURANTII AMARI TINCTURA; U. S.

Tincture of Bitter Orange Peel.

"*Tinctura Aurantii*" of the old Pharmacopœia (1870).

Moisten two hundred grams (7 ounces 24 grains) bitter orange peel, in No. 30 powder, with an equal weight of diluted alcohol. Macerate

twenty-four hours. Pack it moderately in a conical percolator and percolate with diluted alcohol until one thousand grams (or 34 fluidounces) of tincture has been collected.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Aurantii [Amari] Corticis Oleum; U. S.

Oil of Bitter Orange Peel.

The "Oil of Orange Peel" of the new Pharmacopœia (1880) may be the volatile oil of either the bitter orange peel or the sweet orange peel. This we believe to be unwise, for there is a material difference between the two volatile oils.

The volatile oil of bitter orange peel is paler and has a less sweet fragrance than the volatile oil of sweet orange peel. Distinction is properly made between them in the trade.

The volatile oil of sweet orange peel is much to be preferred for the purposes for which the Pharmacopœia directs the use of "Oil of Orange Peel."

Used only as a flavoring agent.

Aurantii Dulcis Cortex; U. S.

Sweet Orange Peel.

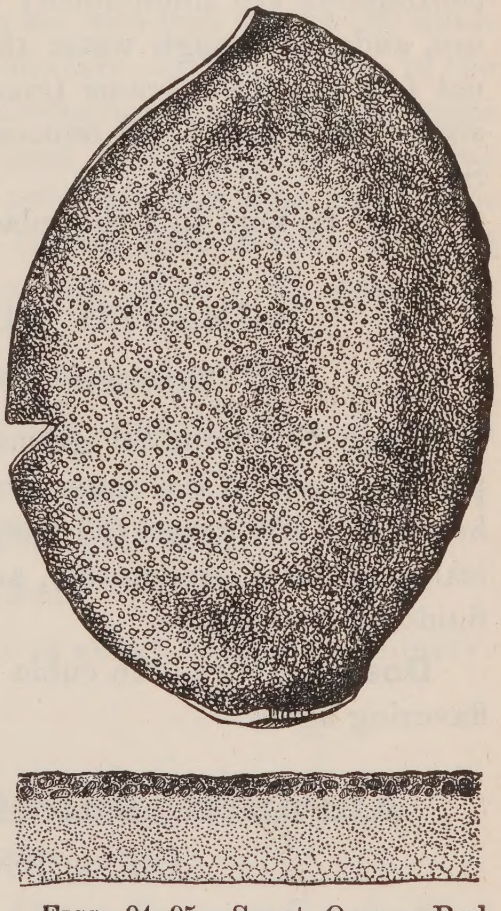
Apfelsinenschalen, G.; *Écorce d'oranges douces*, F.; *Naranjo dulce*, Sp.; *Apelsinskal*, Sw.

Origin.—*Citrus Aurantium*, Risso (*Aurantiaceæ*).

Habitat.—Cultivated in Southern Europe, and in Florida and the West Indies.

Part used.—The rind of the fruit.

Description.—See the Pharmacopœia, page 51.



Figs. 94, 95.—Sweet Orange Peel, natural size; section of peel, enlarged.

Constituents.—Resembling those of the bitter orange peel. The volatile oil of sweet orange peel is, however, a different one from that of the bitter orange peel, and the bitter hesperidin is not found in as large a proportion in the sweet orange peel.

Medicinal Uses.—It is a stimulant carminative, but is employed mostly as an excipient to improve or disguise the disagreeable taste of other medicines.

AURANTII CONFECTIO.

CONFECTION OF ORANGE PEEL.

Remove the peel from a sufficient number of sweet oranges and grate it. Then beat it up with three times its weight of sugar until a uniform mixture results.

AURANTII SYRUPUS; U. S.

SYRUP OF ORANGE.

Macerate fifty grams (1 ounce 334 grains) sweet orange peel, freshly removed from the fruit, deprived of the inner white fleshy layer, and cut into small pieces, with fifty grams (or 2 fluidounces) alcohol for seven days. Then press out the liquid. Triturate this with ten grams (154 grains) precipitated phosphate of calcium and three hundred cubic centimeters (10 fluidounces) water gradually added. Filter the mixture, and add enough water through the filter to make the final product four hundred grams (measuring 13½ fluidounces). Dissolve in it six hundred grams (21 ounces 70 grains) sugar without the aid of heat. Strain.

Must be kept in a cool place.

AURANTII DULCIS TINCTURA; U. S.

TINCTURE OF SWEET ORANGE PEEL.

Grate two hundred grams (7 ounces 24 grains) fresh sweet orange peel deprived of the inner white fleshy layer; macerate it twenty-four hours with 800 grams (33 fluidounces) alcohol; then pack it into a conical percolator, moderately, and percolate one thousand grams (or 41 fluidounces) tincture.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms), or as a flavoring agent.

Aurantii [Dulcis] Corticis Oleum; U. S.

OIL OF [SWEET] ORANGE PEEL.

See remarks under the head of "Aurantii [Amari] Corticis Oleum."

Oil of orange peel does not keep well. When purchased fresh it must be immediately mixed with about one-twentieth of its weight of alcohol in order to keep from becoming terebinthaceous, unclear, and unfit for use.

Used only for flavoring.

AURANTII ELIXIR; U. S.

ELIXIR OF ORANGE.

Simple Elixir; Aromatic Elixir.

Take seven grams (about ¼ ounce) absorbent cotton, or other clean carded cotton, and pour upon it, a little at a time, 3.50 grams (54 grains) oil of sweet orange peel, picking the cotton apart after each addition so as to thoroughly distribute the oil through it. Put a plug of dry cotton in the neck of a cylindrical percolator, and over that a layer of wetted cotton. Then introduce upon this the cotton impregnated with the volatile oil as directed and pack tightly. To prevent the cotton from rising to the surface of the liquid, which sometimes happens during the subsequent percolation, it is well to put a perforated diaphragm (or two pieces of earthenware, glass, or metal, laid over each other in the form of a cross) on top of the packed cotton. Mix two hundred grams (or eight fluidounces) alcohol with six hundred grams (20 fluidounces) water, and gradually pour this mixture on the cotton in the percolator. When the liquid has passed through, pour on enough water and alcohol mixed in the same proportions as before, and continue the percolation until the total quantity of percolate measures seven hundred cubic centimeters (24 fluidounces). In this dissolve three hundred and fifty grams (12½ ounces) sugar without the aid of heat, strain, and filter.

This is a very agreeable and satisfactory "simple elixir."

Used as a vehicle for the more agreeable administration of certain unpleasantly tasting remedies.

AURANTII SPIRITUS; U. S.

SPIRIT OF ORANGE.

Mix six grams (92½ grains) volatile oil of sweet orange and ninety-four grams (or 4 fluidounces) alcohol.

Aurantii Flores; U. S.

ORANGE FLOWERS.

Orangenblüthen, Pomeranzenblüthen, G.; *Fleurs d'orange*, F.; *La Flor de Naranjo*, Sp.; *Pomeransblommor*, Sw.

Origin.—*Citrus vulgaris* and *Citrus Aurantium*, Risso.

Description.—See the Pharmacopœia, page 51.

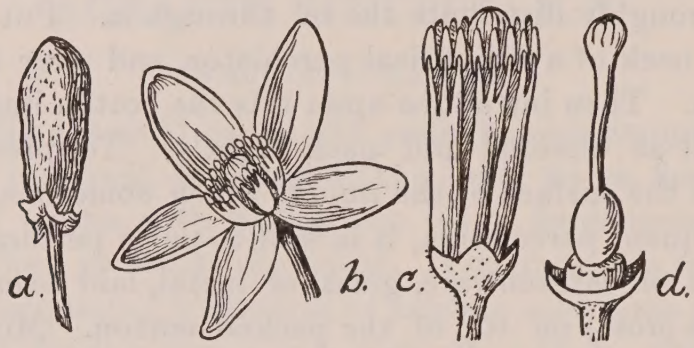
The Pharmacopœia permits the use of orange flowers salted down in crocks, tightly covered, and kept in a cool place.

Must have a powerful fragrance.

Dried orange flowers are worthless.

Constituents.—The only valuable one is the volatile oil (called oil of neroli).

Orange flowers are taken up in the Pharmacopœia because orange flower water may be made from them. It would have been better to



FIGS. 96-99.—Orange Flower. *a*, unopened, natural size; *b*, expanded, natural size; *c*, showing stamens, enlarged; *d*, pistil and disk, enlarged.

make the imported French orange flower water official, for that is the kind generally used and it is better than any made from salted flowers.

AURANTII FLORUM AQUA; U. S.

ORANGE FLOWER WATER.

Made by distillation, the product being ten pounds from four pounds of the recent orange flowers.

Orange flower water must be kept in well-stopped bottles in a dark cool place. Sometimes it becomes mucilaginous and is then unfit for use.

So-called *Triple Orange Flower Water* is imported from France which is of excellent quality, and as fresh orange flowers can rarely be had, the practical way is to use the imported water. Six pounds of the "Triple Orange Flower Water," with four pounds distilled water, will make ten pounds of orange flower water corresponding to the pharmacopœial strength. Of the "Quadruple Orange Flower Water," four pounds, with six pounds distilled water, will make te n pounds orange flower water.

Orange flower water cannot be made from the oil of neroli (the volatile oil of orange flowers).

Orange flower water makes a good flavoring agent for medicated syrups, etc.

AURANTII FLORUM SYRUPUS.

ORANGE FLOWER WATER SYRUP.

Dissolve eight hundred and fifty grams (30 ounces) sugar in four hundred and fifty cubic centimeters (15¼ fluidounces) orange flower water, without the aid of heat, after which strain or filter.

Aurantii Florum Oleum; U. S.

OIL OF ORANGE FLOWERS.

Aurantii Florum Ætheroleum—Oleum Neroli.

Description.—See the Pharmacopœia, page 234.

Oil of neroli is the most important of all the ingredients in good cologne water.

Aurantii Folia.

ORANGE LEAVES.

Origin.—*Citrus vulgaris*, Risso (*Aurantiaceæ*).

Smooth, oval-oblong, undivided, leathery, transparently dotted, of good green color, fragrant odor, and aromatic taste.

Uses.—As a flavoring ingredient in infusions, tinctures, etc.

Aurantii Fructus Immaturi.

UNRIPE ORANGE FRUIT.

Unreife Pomeranzen, G.; *Orangettes, Petits grains*, F.; *Pomeransknopp*, Sw.; *Orange berries.*

Origin.—*Citrus vulgaris*, Risso (*Aurantiaceæ*).

The drug consists of the unripe fruit gathered either from the trees or from the ground after falling. The unripe fruit in its dry state as met with in trade is round; very hard; varying from three to fifteen millimeters (⅛ to ⅗ inch) in diameter; externally of a very dark greenish-brown; odor fragrant; taste bitter aromatic.

The "orange berries" vary from the size of small peas to the size of large cherries. Occasionally the drug is sorted, the different sizes being sold separately. Those of about twelve millimeters (½ inch) diameter are the best.

Constituents.—Volatile oil ("oil of petits grains").

Uses.—Mainly for flavoring. Also, but rarely, as "issue peas."

Aurantii Succus.

ORANGE JUICE.

The juice of fresh sweet oranges.

Pale yellowish, slightly turbid, agreeably sweetish, acidulous, and having a faint odor of orange.

Used for making

AURANTII SUCCI SYRUPUS.

SYRUP OF ORANGE JUICE.

Heat four hundred cubic centimeters (13½ fluidounces) fresh orange juice to the boiling point; add twenty grams (300 grains) fresh sweet orange peel. Let the whole stand well covered until cold. Then filter the liquid and dissolve in it, without the aid of heat, six hundred grams (21 ounces) sugar. Strain.

A very agreeable flavoring syrup.

Auri et Sodii Chloridum; U. S.

CHLORIDE OF GOLD AND SODIUM.

Aurico-Sodicum Chloridum.

See the Pharmacopœia, page 52.

A mixture of equal parts of chloride of gold and chloride of sodium.

A yellow, crystalline, deliquescent powder.

Medicinal Uses.—Has been employed in some of the *neuroses*, in *melancholia* and *hypochondria*; also in *syphilis*, *seminal weakness*, *chronic Bright's disease* from granular and fibroid kidney, etc. It is seldom used at present.

Dose.—0.002 to 0.006 gram ($\frac{1}{30}$ to $\frac{1}{10}$ grain) three times daily in pill.

Avenæ Crimna.

OATMEAL.

Oaten Groats.

Contains the same constituents as the other cereals but more fixed oil (about 4 per cent.).

It is used for the same purposes and in the same manner as hordeum (barley). Oatmeal gruel is given after cathartics, and is also used for enemas.

Azedarach; U. S.

AZEDARACH.

Azedarachtæ Cortex—Zedrachrinde, G.; *Écorce d'Azédarach, Écorce de Margousier*, F.—*Pride of India; Pride of China.*

Origin.—*Melia Azedarach*, Linné (*Meliaceæ*).

Habitat.—China, India. Naturalized in Southern Europe and in the United States along the Gulf of Mexico.

Part used.—The bark of the root.

Description.—See the Pharmacopœia, page 52.

The bark of roots of medium size and not too old should be preferred, and the corky outer layer rejected.

Constituents.—One or more bitter principles, resins, and volatile oil.

Medicinal Uses.—As a vermifuge for lumbricoid worms, resembling spigelia in its effects. In overdoses it may produce narcotic poisoning. It has been administered in decoction made by boiling sixty grams (2 ounces) of the bruised bark in five hundred cubic centimeters (17 fluidounces) water until two hundred and fifty cubic centimeters (8½ fluidounces) remains. The dose of this decoction for a child is a tablespoonful every two or three hours until it affects the bowels. It should be followed by a cathartic.

Balnea.

BATHS.

Baths are used for local or general effects, and are cold, tepid, or hot, simple or medicated, according to the requirements of the case.

When applied to the whole surface of the body they are simply called baths; if applied to the hips, by sitting in them, sitz-baths or hip-baths; if applied to the feet, foot-baths; if applied with a sponge, sponge-baths; if in a stream or rain from a perforated nozzle, douches, etc.

The cold bath is one having a temperature of about 20° C. (68° F.) or less, and is used to reduce the temperature of the body in various fevers, as in typhus, eruptive fevers, congestions and inflammations, *coup de soleil*, etc.

It is also a powerful stimulant, and in narcotic poisoning is a remedy of much value.

Before entering the bath cold water should be poured over the head and shoulders to prevent congestion of the brain, and after leaving it the patient's skin should be rubbed with towels until reaction occurs.

If the patient cannot enter the bath, the effects of the cold water

may be obtained by wrapping him in cloths dipped in cold water, which must be frequently renewed, or by pouring or sprinkling the water over the exposed body from a douche, hose, or sprinkling can.

The cold bath may be partial, as when cold water or ice is applied to the head in some brain troubles, to the chest in pneumonia or pleuritis, to the abdomen in peritonitis, etc.

For the purpose of reducing the temperature by dry cold the patient may be placed dry upon a rubber mattress filled with cold water.

The luke-warm or tepid bath may vary in temperature from about 20° C. (68° F.) to 35° C. (95° F.). This bath is used mainly for cleansing purposes. If a patient is immersed in a bath only a few degrees below the temperature of the body the water will abstract heat, and the tepid bath is therefore a valuable means of reducing temperature, although it does so more slowly than the cold bath.

The warm or hot bath varies in temperature from 35° C. (95° F.) to 41° C. (106° F.). It is relaxing and soothing in its effects, and is much used for the purpose of allaying convulsions, etc., especially in children. By relaxing the skin it promotes sweating and the pores become cleansed. As a diaphoretic it may be applied by wrapping the patient in a sheet wrung out of water, which need not be warm, and then covering him up. The heat of the body soon raises the temperature of the water in the sheet and it becomes a warm pack.

The warm bath is useful as a stimulant in shock, collapse, great exhaustion, convulsions, sleeplessness, etc. For the latter purpose it often suffices to sponge the spine with as hot water as the patient can bear, just before going to bed.

When a patient enters a hot bath congestion of the brain may take place, to prevent which cold affusions to the head may be used, or the patient may be placed into water of about 35° C. (95° F.) and hot water gradually added until the temperature is raised to the desired degree. Care must be taken not to scald the patient when adding the hot water.

Medicated baths consist of water in which some medicinal substance is held in solution. The most commonly employed bath of this kind is the mustard-bath for counter-irritation. Other baths are used in skin diseases, syphilis, etc.

The Roman bath consists in the exposure of the body to dry warm air, which stimulates perspiration, relaxes the tissues, and opens the pores of the skin ; this is followed by a plunge into cold water and then friction with towels in a moderately warm room. Often useful in chronic rheumatism, skin diseases, etc. In the latter cases the body may be anointed during the frictions with appropriate ointments, which will find easier entrance into the pores of the skin.

The Turkish bath as employed in Turkey consists of a room the temperature of which is about 40° C. (104° F.) in which the bather lies on a slab and is shampooed with soap, water and towels and the gloves of the attendant until clean, after which he is wrapped in cloths and taken to a room of a temperature of about 35° C. (95° F.), where he reclines until he is cooled.

The Turkish bath, as generally used in this country, differs from the genuine in regard to the temperature, which is here much higher, often being raised to 66° C. (150° F.) or more, while the gentle shampooing of the orientals is replaced by a coarse and rough massage and kneading by the occidentals. This massage of course may be indicated, especially in cases of rheumatic joint-disease.

The Russian bath is a hot vapor-bath. The temperature of the vapor varies from 40° C. (104° F.) to 66° C. (150° F.). Shampooing, friction, etc., are added. To prevent injury from inhaling the hot vapor, the bather breathes through a sponge dipped in cold water which is held over his mouth and nostrils. A cold plunge follows the hot vapor-bath, after which the bather immediately returns to a hot room and dresses.

The sun-bath is a valuable hygienic measure unfortunately too seldom employed. It consists in exposing the naked body to the rays of sunlight entering through a window into a warm room without air-drafts. As we live now, all of our body, except the head and hands, is in continual darkness, which is not conducive to good health. The sun-bath will be found of great value in debilitated conditions, incipient consumption, nervousness, etc. This bath was very popular among the ancient Romans. A few years ago it was introduced into this country in the form of the blue-glass mania. Alternate sheets of blue and white glass were set into the window, checker-board style.

The blue glass was useless charlatanry, and people allowed themselves to be ridiculed out of the use of this form of sun-bath. Unfortunately, however, they poured out the baby with the bath and ceased to expose their bodies to the plain, simple health-giving rays of the sun when they ordered the blue glass to be taken out of their windows.

Baptisia.

BAPTISIA.

Baptisiæ Radix—Wild Indigo.

Origin.—*Baptisia tinctoria*, Robert Brown (*Leguminosæ*).

Habitat.—North America.

Part used.—The root.

Description.—Short, knotty, branched, the head five to eight cen-

timeters (2 to 3 inches) and the branches about twelve millimeters ($\frac{1}{2}$ inch) thick. Bark grayish-brown externally and whitish in the interior. Wood tough. Inodorous. Taste of bark bitter and acrid.

Constituents.—Contains an alkaloid and resin, neither of which has been fully examined.

"*Baptisin*" is an impure resin, probably containing some of the alkaloid. It has been made by precipitating an alcoholic extract with water.

Medicinal Uses.—A stimulant, purgative, and emetic; also reputed to be antiseptic.

Used in poultices and fomentations as an application to foul and chronic ulcers.

Dose.—About one gram (15 grains) several times a day.

BAPTISIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF BAPTISIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.25 to 1.50 cubic centimeter (4 to 20 minims).

Barium.

BARIUM.

One of the alkaline earth metals. Its salts are mostly white and many of them insoluble in water. Barium sulphate is quite insoluble, even in dilute acids. The carbonate is also insoluble, while the chloride and nitrate are readily soluble, in water.

Barii Carbonas.

BARIUM CARBONATE.

Baricus Carbonas.

A white powder insoluble in water but soluble without residue in dilute hydrochloric acid, and this solution gives a heavy white precipitate with sulphuric acid.

Employed in making other barium salts.

Barii Chloridum.

BARIUM CHLORIDE.

Baricum Chloridum.

Colorless crystals, not affected by exposure to the air, and readily soluble in water. The aqueous solution gives a heavy white precipitate with sulphuric acid. Inodorous. Taste bitter, salty, astringent.

Its solution is used as a reagent for sulphuric acid and sulphates.

Barii Nitras.

BARIUM NITRATE.

Baricus Nitras.

White crystals readily soluble in water. Inodorous, taste bitter. Used as the barium chloride.

Beberinæ Sulphas.

SULPHATE OF BEBERINE.

Beberine is an alkaloid obtained from nectandra or bebeeru bark. The sulphate of beberine is used in medicine. It is in thin dark brown transparent scales ; inodorous, but having a very bitter taste. Soluble in water and in alcohol.

Must not be confounded with *berberine* sulphate.

Medicinal Uses.—A bitter tonic. Also said to be antiperiodic.

Dose.—As a tonic, 0.05 to 0.15 gram (1 to 3 grains) ; as an antiperiodic, 0.30 to 0.60 gram (5 to 10 grains).

Bela.

BAEL FRUIT.

Belæ Fructus—Bengal Quince.

Origin.—*Ægle Marmelos*, De Candolle (*Aurantiaceæ*).

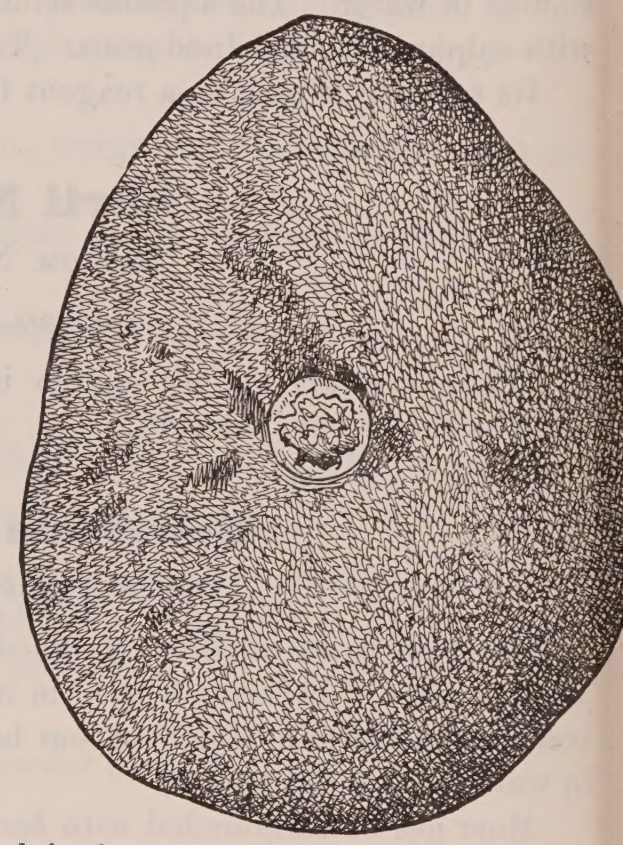
Habitat.—East Indies.

Part used.—The unripe fruit.

Description.—Orange shaped, five to ten centimeters (2 to 4 inches) in diameter, but as found in the trade it is broken. The rind is externally brownish-gray, smooth, hard, two to three millimeters ($\frac{1}{12}$ to $\frac{1}{8}$ inch) thick. The pulp, which adheres to the rind, is reddish-brown, internally whitish, mucilaginous, acidulous, and encloses oblong, flat,

hairy seeds. The drug is inodorous. The taste of the rind is slightly astringent.

Constituents.—Contains a small amount of tannin, besides mucilage, sugar, a bitter substance, and a minute quantity of volatile oil.



FIGS. 100, 101.—Bael Fruit, natural size, inner and outer surface.

Medicinal Uses.—Astringent, aromatic, and demulcent; much used in India in *bowel complaints*, *diarrhœas*, and *dysentery*.

Dose.—Two to five grams (30 to 75 grains), preferably given in the form of strong infusion.

Belladonnæ Folia; U. S.

BELLADONNA LEAVES.

Tollkirschenblätter, *Wolfskirschenblätter*, *Tollkraut*, G.; *Feuilles de Belladonne*, F.; *La Hoja de Belladonna*, Sp.; *Belladonnablad*, Sw.

Origin.—*Atropa Belladonna*, Linné (*Solanaceæ*).

Habitat.—Cultivated in Europe and America.

Description.—See the Pharmacopœia, page 53.

In drying, the leaves become very much wrinkled and acquire a brownish hue on their upper surface.

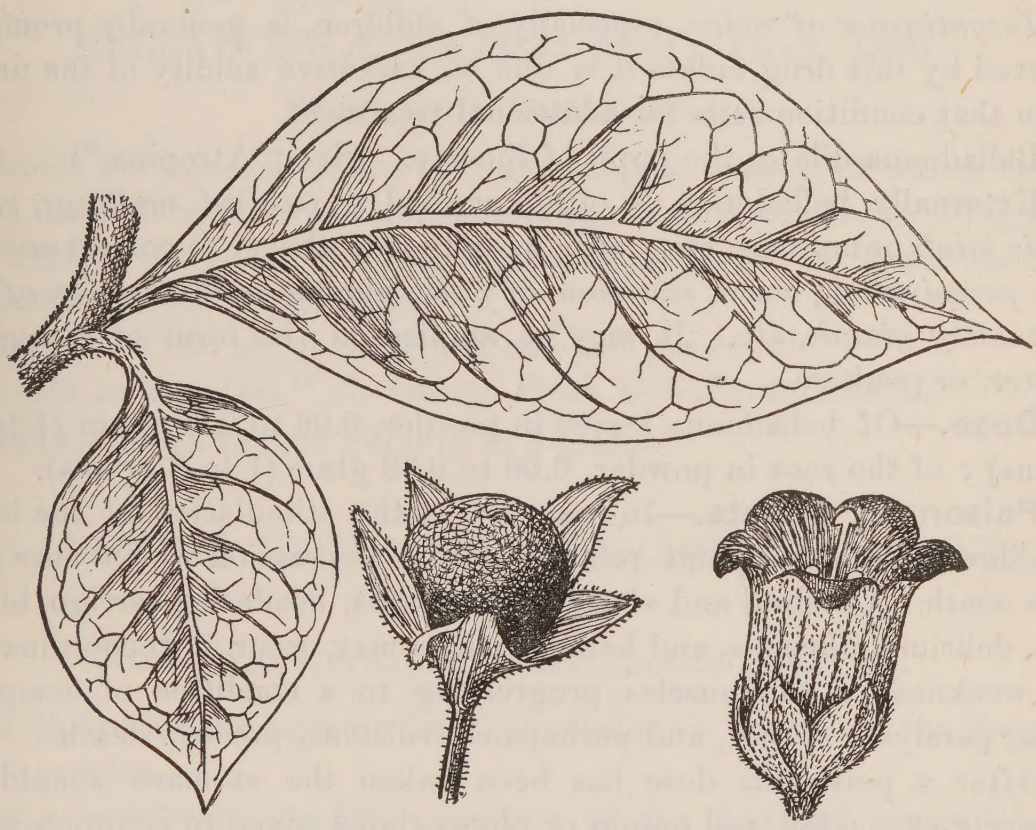
The lateral veins of the larger leaves form a large angle with the

midrib, and the upper surface of the parenchyma shows under the microscope numerous whitish dots on the brown background.

The odor, if any, is somewhat narcotic. The taste is disagreeable, bitter.

Must consist of tolerably whole and well-preserved leaves.

Constituents (of leaves and roots).—Two alkaloids, one called atropine, of which the root contains more than the leaves but not over one-fourth per cent., and the other called belladonnine, of which little



FIGS. 102–104.—Belladonna Leaves, Flower, and Fruit, all natural size.

is known. It is amorphous, and dilates the pupil of the eye as atropine does. Recent investigations would seem to show that the seeds and fruit contain more atropine than any other part of the plant, at least in the fresh state.

Medicinal Uses.—Belladonna is an excito-motor, increasing the power of the heart's action, and rendering this remedy useful in *opium* or *chloroform poisoning* or in *collapse* with threatening paralysis of the heart from any cause.

This remedy checks the secretions from the salivary, mammary, and sudoriferous glands ; the fauces become dry, perspiration is suppressed, and the flow of milk decreased or entirely checked. It is used to check *night-sweats*, *excessive sweating*, and other anomalous conditions of perspiration ; also to suppress the flow of milk and to prevent *abscesses*

of the breasts. For these purposes it is used both internally and externally.

Belladonna increases the peristaltic action of the intestines, and is a valuable ingredient of prescriptions for the relief of *chronic constipation.*

It is used as an anodyne and antispasmodic in *asthma, whooping-cough,* etc.; also in *neuralgia,* dysmenorrhœa, *ovarian* or *uterine colic,* etc.

It has proved of great use in *typhoid* conditions of various fevers, and often induces sleep in the *insomnia* accompanying these conditions.

Incontinence of urine, especially of children, is generally promptly relieved by this drug unless it is due to excessive acidity of the urine, when that condition calls for additional treatment.

Belladonna dilates the pupil of the eye. (See "Atropina.")

Externally belladonna is often applied to *painful swellings, rheumatic joints* or muscles, etc.; also, as indicated above, to correct *anomalous perspiration,* check *secretion of milk,* subdue *inflammation of the mammary glands,* etc. It may be applied in the form of ointment, plaster, or poultice.

Dose.—Of belladonna leaves in powder, 0.06 to 0.66 gram (1 to 10 grains); of the root in powder, 0.06 to 0.33 gram (1 to 5 grains).

Poisonous Effects.—In toxic doses the stimulation of the heart is followed by subsequent relaxation and depression which may produce death. Cerebral and visual disturbances, headache, vertigo, blindness, delirium, illusions, and hallucinations may occur. Incoordination and weakness of the muscles, progressing to a condition of complete motor paralysis, stupor, and perhaps convulsions, precede death.

After a poisonous dose has been taken the stomach should be promptly evacuated, and opium or physostigma given to counteract the action of the poison on the nervous system.

BELLADONNA CIGARETTES FOR ASTHMA (*Trousseau*).

Belladonna leaves, 0.33 gram (5 grains); hyoscyamus leaves, stramonium leaves, each 0.2 gram (3 grains); extract of opium, 0.012 gram ($\frac{1}{5}$ grain); cherry laurel water, q. s.

The leaves are moistened with a solution of the opium in the cherry laurel water and when dry made into a cigarette. Two to four such cigarettes may be smoked daily.

BELLADONNÆ CATAPLASMA.

BELLADONNA POULTICE.

Mix thirty grams (1 ounce) coarsely powdered belladonna leaf with ninety grams (3 ounces) flaxseed meal, and stir the mixture gradu-

ally into three hundred cubic centimeters (10 fluidounces) boiling water.

A better result may be obtained by adding thirty cubic centimeters (1 fluidounce) fluid extract of belladonna leaf to three hundred grams (10 ounces) hot linseed poultice.

Used as a soothing application over the lower abdomen in *painful affections* of the pelvic organs, as in *irritation of the bladder, uterine colic, dysmenorrhœa*, etc. Its effect is often prompt and grateful.

BELLADONNÆ EXTRACTUM; PHAR. 1870.

EXTRACT OF BELLADONNA.

Bruise five hundred grams (17⅔ avoirdupois ounces) of FRESH belladonna leaves in a stone mortar, sprinkling a little water on the drug, and then express the juice, heat it to the boiling point, strain, and evaporate to the consistence of pill mass.

Brown. Yield about three and one-half per cent.

Ought to be called "*Extract of Fresh Belladonna Leaves.*"

Dose.—0.015 to 0.03 gram (¼ to ½ grain).

BELLADONNÆ EXTRACTUM [FOLIORUM] ALCOHOLICUM; U.S.

ALCOHOLIC EXTRACT OF BELLADONNA [LEAVES].

From five hundred grams (or 17⅔ avoirdupois ounces) of the drug in No. 60 powder.

As a *menstruum* use first a mixture of one thousand grams (about 41¾ fluidounces) of alcohol mixed with five hundred grams (about 17 fluidounces) of water. Moisten the powder with two hundred grams (about 8 fluidounces) of the mixture. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Then percolate. Reserve four hundred and fifty grams (about 16½ fluidounces) of *first percolate.* Continue until the drug is exhausted, or until one thousand and fifty grams (about 37 fluidounces) of *second percolate* has been collected, using diluted alcohol as a second menstruum after the first mixture of alcohol and water has been all used. Evaporate the *second percolate* to fifty grams (1⅔ ounce) and mix that with the *first percolate.* Then evaporate the mixture to a pilular consistence. To the solid extract obtained add one-twentieth of its weight of glycerin.

Practically the same product is received by evaporating fluid extract

of belladonna leaves to a solid extract and then incorporating five per cent. of glycerin.

Greenish brown. Yield about twenty-two per cent.

Dose.—0.01 to 0.03 gram ($\frac{1}{6}$ to $\frac{1}{2}$ grain).

BELLADONNÆ FOLIORUM EXTRACTUM FLUIDUM.

Fluid Extract of Belladonna Leaves.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Dose.—0.2 to 0.3 cubic centimeter (3 to 5 minims).

BELLADONNÆ OLEUM INFUSUM.

Infused Oil of Belladonna.

Beat five hundred grams ($17\frac{2}{3}$ ounces) fresh belladonna leaves with a small quantity of olive oil into a poultice. Then add one thousand grams (34 fluidounces) olive oil and heat the mixture over a water-bath until the moisture has evaporated, after which express the oil and filter it.

Used for external application.

BELLADONNÆ SUCCUS.

Belladonna Juice.

Bruise a convenient quantity of fresh leaves and young branches of belladonna in a stone mortar. Press out the juice, and add to it one-third of its measure of alcohol. Set the mixture aside for seven days, and then filter.

Must be kept in a cool place.

Dose.—0.25 to 1 gram (4 to 15 grains).

BELLADONNÆ SUPPOSITORIA.

Belladonna Suppositories.

Mix intimately forty centigrams (about 6 grains) alcoholic extract of belladonna and twenty grams (about 309 grains) cacao butter, the extract being first triturated with a drop or two of water to form a smooth soft paste. Make twelve suppositories.

Introduced into the rectum in cases of *painful affections* of the pelvic organs.

BELLADONNÆ [FOLIORUM] TINCTURA; U. S.

TINCTURE OF BELLADONNA [LEAVES].

Moisten one hundred and fifty grams (5 ounces 127 grains) belladonna leaves, in No. 60 powder, with two hundred grams (or 7 fluidounces) diluted alcohol; macerate for twenty-four hours; pack it tightly in a cylindrical percolator and percolate with a sufficient quantity of diluted alcohol to obtain one thousand grams (35 ounces 120 grains) tincture (measuring about 35 fluidounces).

Dose.—One to two cubic centimeters (15 to 30 minims).

BELLADONNÆ UNGUENTUM; U. S.

BELLADONNA OINTMENT.

Triturate ten grams (154 grains) alcoholic extract of belladonna with six grams (100 minims) diluted alcohol until a uniform soft paste is obtained, and mix this thoroughly with eighty-four grams (2 ounces 420 grains) benzoinated lard, gradually added.

Applied externally to relieve *pain*. Also applied to check *excessive sweating*, or to the breasts, to check the secretion of milk or avert *inflammation* of the mammary gland.

Belladonnæ Radix; U. S.

BELLADONNA ROOT.

Tollkirschenwurzel, Wolfskirschenwurzel, G.; *Racine de Belladonne*, F.; *La Raiz de Belladonna*, Sp.; *Belladonnarot*, Sw.

Origin. — *Atropa Belladonna*, Linné (*Solanaceæ*).

Description.—See the Pharmacopœia, page 53.

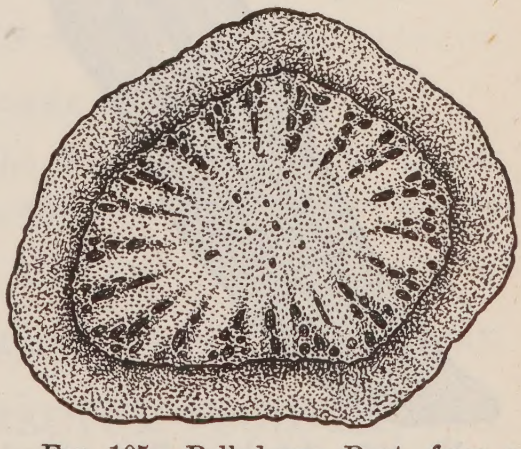


FIG. 105.—Belladonna Root, from a young plant; transverse section, enlarged.

The root from young flowering plants is the best. Old roots are known by their large wood. Must be perfectly sound. It is not infrequently decayed, worm-eaten, discolored, or mouldy. Belladonna root contains a large amount of starch.

Constituents.—See under title "Belladonna Folia."

BELLADONNÆ ABSTRACTUM; U. S.

Abstract of Belladonna.

Two hundred grams (or 7 ounces) of belladonna root, in No. 60 powder, is moistened uniformly (by rubbing between the hands) with eighty grams (3⅓ fluidounces) ninety-four per cent. alcohol. The moist powder is packed tightly in a tall cylindrical percolator. More alcohol is now added until the mass is saturated and the liquid begins to drop at the lower end of the percolator, while a layer of the alcohol still covers the upper surface of the drug. The exit of the percolator is now closed and the top covered to prevent evaporation. The whole is allowed to stand forty-eight hours. Then the percolation is started, adding alcohol as required to keep the drug always covered. When one hundred and seventy grams (or 7 fluidounces) of percolate has been obtained, set that portion aside. Place another receiver under the percolator and continue the process until the drug is exhausted. Evaporate this second percolate down to thirty grams (1 ounce). Mix this with the reserved portion. The mixed liquids (weighing two hundred grams (7 ounces)) are put in a tared evaporating dish with fifty grams (770 grains) powdered milk-sugar, and set in a place where the temperature is between 40° and 50° C., or from 104° to 122° F., until the mixture is dry. Then enough powdered sugar of milk is added to make the total weight of the contents of the dish one hundred grams (3 ounces 230 grains). The whole is now triturated until a unifom and very fine powder is obtained.

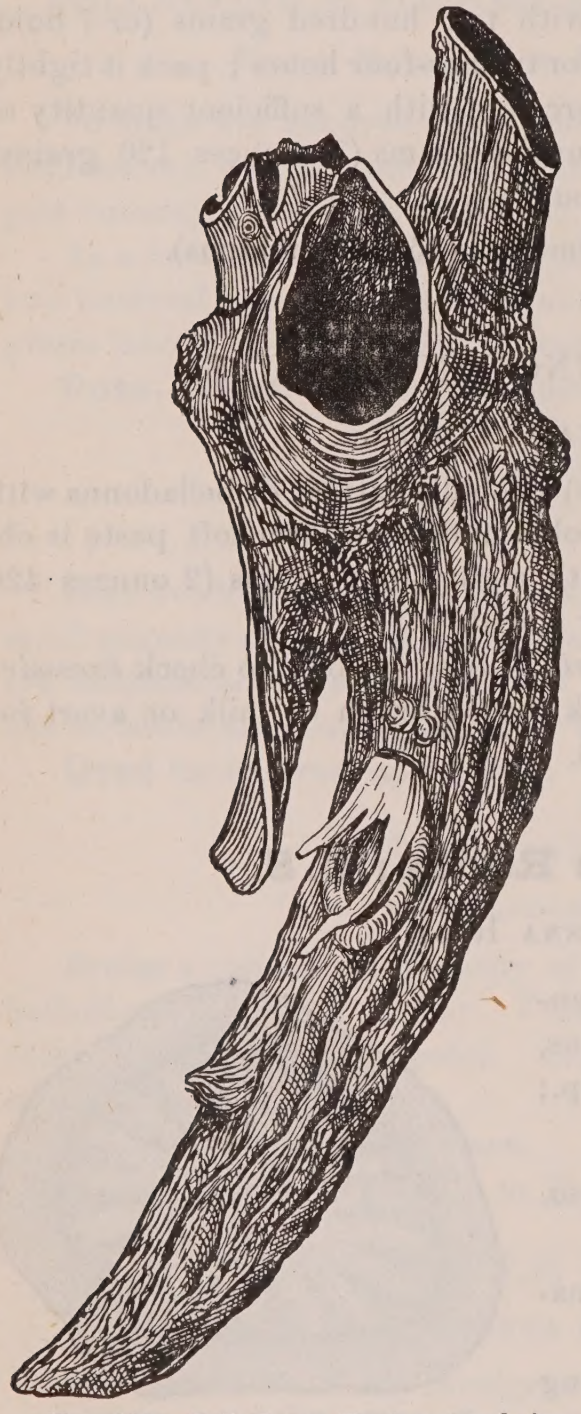


Fig. 106.—Belladonna Root, natural size (from an old plant).

The same product may be obtained by evaporating one thousand cubic centimeters of the fluid extract of belladonna root with the requisite quantity of milk sugar, making five hundred grams finished product.

[Two avoirdupois pounds of powdered belladonna root will yield one pound of abstract. This will require one-half pint alcohol for moistening, and about half a pint more for saturating the drug preparatory to the forty-eight hours' maceration. The reserved portion will measure about two pints, and the second percolate, after evaporation to the prescribed point, will measure nearly six fluidounces.] Is more uniform than the extract and more easily dispensed.

Dose.—0.03 to 0.1 gram ($\frac{1}{2}$ to 2 grains).

BELLADONNÆ EMPLASTRUM; U. S.

Belladonna Plaster.

Evaporate five hundred cubic centimeters (17 fluidounces) of fluid extract of belladonna root to the consistence of thick, soft extract, and then incorporate with it thoroughly enough resin plaster, previously melted, to make the whole weigh five hundred grams ($17\frac{2}{3}$ avoirdupois ounces). Almost identical with the Belladonna Plaster of 1870.

It is dark brown—*not green.* When green it cannot be the official plaster, but has probably been made from the extract of the leaves.

This is an excellent application to relieve *neuralgic* or *rheumatic pains.* It is one of the best local applications in *intercostal neuralgia.* Belladonna plaster should not be applied except to unbroken skin, as it is apt to produce the toxic effects of belladonna by the absorption of its active principle through a wound.

BELLADONNÆ RADICIS EXTRACTUM.

Extract of Belladonna Root.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.008 to 0.015 gram ($\frac{1}{8}$ to $\frac{1}{4}$ grain), two to three times daily.

BELLADONNÆ [RADICIS] EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Belladonna [Root].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and seventy-five grams (about 7½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

For suggestions as to details, see page 451.

Dose.—0.05 to 0.2 cubic centimeter (1 to 3 minims).

BELLADONNÆ LINIMENTUM; U. S.

BELLADONNA LINIMENT.

Dissolve thirty grams (1 ounce) camphor in five hundred and seventy grams (20 ounces) fluid extract of belladonna root.

This is a valuable anodyne for external application in *rheumatism, neuralgia,* etc.

BELLADONNÆ RADICIS TINCTURA.

TINCTURE OF BELLADONNA ROOT.

Make one thousand cubic centimeters (34 fluidounces) tincture, by percolation, from one hundred and fifty grams (5 ounces 127 grains) belladonna root in No. 60 powder, using alcohol as a *menstruum.*

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims), commencing with small doses and increasing these if necessary.

Benzinum; U. S.

BENZIN.

Petroleum Benzin, Petroleum Ether.

Description and Tests.—See the Pharmacopœia, page 54.

Being very inflammable it must be kept in tight bottles or tin cans in a cool place, away from fire or lights.

Must not be confounded with benzol, which is sometimes erroneously called benzin, but which dissolves in less than its own volume of alcohol and has a specific gravity of 0.85 to 0.90, whereas benzin requires six times its own volume of alcohol to dissolve it, and has a specific gravity of 0.670 to 0.675.

Uses.—Benzin is a powerful solvent of fixed oils, caoutchouc, paraf-

fin, mastich, damar, and other matters. It is accordingly much used in the arts. In the new Pharmacopœia it is introduced because of its pharmaceutical uses in the preparation of sinapism paper, oleo-resins, etc. Druggists sell considerable quantities of benzin for removing grease spots.

Benzoinum; U. S.

BENZOIN.

Benzoë Resina, Asa Dulcis—Benzoe, G. and Sw.; *Benzoin*, F.; *Benjui*, Sp.—*Gum Benjamin.*

Origin.—*Styrax Benzoin*, Dryander (*Styracaceæ*).

Habitat.—Siam, Sumatra, etc.

Part used.—The resin.

Description.—See the Pharmacopœia, page 54.

A balsamic resin in agglutinated masses of yellowish-brown, opaque, internally white tears, held together by a translucent, yellowish-brown resin, or in reddish-brown masses having a marbled appearance from the white "almonds" or tears imbedded in it.

There are three principal kinds of benzoin, viz.:

Siam Benzoin in tears, consisting of separate tears, about twenty-five millimeters (an inch) long, externally of a pale reddish-yellow color, internally waxy and milk-white. In small splinters it is more or less transparent. This is the finest benzoin obtainable, and has a most agreeable odor, reminding of vanilla.

Siam Benzoin in masses, which consists of the tears or "almonds" just described as "Siam Benzoin in tears," imbedded and held together in solid masses by a reddish-brown or almost brick-colored resin. The value of this variety of benzoin depends directly upon the proportion of almonds in it. It is called also "Amygdaloid Benzoin."

Both kinds of Siam benzoin, described above, dissolve almost entirely in moderately warm alcohol. Only partially soluble in ether. When heated it emits irritating but fragrant vapors of benzoic acid.

Sumatra or Penang Benzoin is in grayish-brown, sometimes pale chocolate-brown, masses, with no distinct almonds, an agreeable odor, but reminding of storax, and fainter than the odor of Siam benzoin. Usually full of pieces of bark. Contains about ten per cent. cinnamic acid, besides the benzoic acid, of which it has less than Siam benzoin. It is very inferior benzoin, and excluded by the Pharmacopœia, not answering its description of the drug to be used.

It is to be regretted that the English name of the resin described —"Benzoin"—should be at the same time the botanical name of the

spice bush, of which the bark and the fruit are both more or less used for medicinal purposes. (See "Lindera.")

Constituents.—About eighty per cent. resins of various kinds, differing as to their respective solubilities in alcohol, ether, and solution of potassa; from twelve to twenty per cent. benzoic acid; and traces of volatile oil. It is stated that there is more benzoic acid in the semi-translucent reddish-brown resin between the almonds than in the almonds themselves. There is little if any cinnamic acid in Siam benzoin.

Uses.—To prepare the tincture of benzoin and benzoinated lard; in cosmetic lotions; for fumigations; in perfumery; for the preparation of benzoic acid; etc.

Not used *per se* in medicine.

BENZOINI TINCTURA; U. S.

Tincture of Benzoin.

Macerate two hundred grams (7 ounces 24 grains) benzoin, in moderately coarse powder, with three hundred and twenty grams (13⅓ fluidounces) alcohol for seven days in a closed vessel; then filter the tincture through paper, adding enough alcohol, through the dregs in the filter, to make the whole product weigh one thousand grams (35 ounces 120 grains, measuring 40 fluidounces).

Seldom used internally. Externally it is used as a cosmetic, being added to water and used as a wash to remove *freckles*, etc.

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm).

BENZOINI TINCTURA COMPOSITA; U. S.

Compound Tincture of Benzoin.

Friar's Balsam.

Macerate a mixture of one hundred and twenty grams (about 4 ounces 100 grains) benzoin, and twenty grams (309 grains) aloes, both in coarse powder, eighty grams (2 ounces 359 grains) storax, and forty grams (1 ounce 180 grains) tolu balsam with seven hundred and fifty grams (32 fluidounces) alcohol in a closed vessel for seven days. Filter through paper, adding enough alcohol, through the dregs in the filter, to make the final product one thousand grams (measuring 40 fluidounces). Uses similar to those of the simple tincture.

BENZOINI UNGUENTUM.

(*See Benzoinated Lard*, page 68.)

Benzol.

BENZOL.

A petroleum product, having a strong odor of coal gas. It is colorless, has great refractive power, and is very inflammable. It has a specific gravity of from 0.85 to 0.90, and boils at 80.4° to 85° C. (177° to 185° F.). Chemically pure benzol boils at 80.4° C. (177° F.), and has a specific gravity of 0.88 at 15° C. (59° F.). It is used chiefly as a solvent, its properties as such resembling very much those of Benzin, which see.

Berberina.

BERBERINE.

Berberine is an alkaloid which exists in many plants belonging to the natural orders Berberidaceæ, Menispermaceæ, and Ranunculaceæ. It is found in berberis, coptis, columbo, podophyllum, hydrastis, xanthorrhiza, xanthoxylum, menispermum, etc.

Should not be confounded with the alkaloid *Bebeerine* from Nectandra bark.

Pure *Berberine* is in fine yellow prismatic crystals of strongly bitter taste, soluble in hot water and in alcohol, but insoluble in ether. Its salts are bright yellow, crystallizable. When a small quantity of test-solution of iodine is added to a solution of berberine, brilliant green scales are deposited, if care is taken not to add the iodine in excess.

Medicinal Uses.—Berberine is a bitter tonic and stomachic, possessing also febrifuge and cholagogue properties. It has been used with good effect in *atonic dyspepsia*, *diarrhœa* accompanying *malarial troubles*, and similar complaints.

Dose.—0.1 to 0.25 gram (2 to 4 grains).

Berberis Oregonensis.

BERBERIS AQUIFOLIUM.

Oregon Grape, Oregon Berberis.

Origin.—*Berberis aquifolium*, Pursh; *Berberis nervosa*, Pursh; and *Berberis repens*, Lindley (*Berberidaceæ*).

Habitat.—Pacific coast from Colorado westward.

Part used.—The roots.

Description.—All of these roots are used under the name of "Berberis aquifolium." The roots of Berberis aquifolium are large, branched, more or less knotty, and extremely tough. They vary in

thickness from three to fifty millimeters ($\frac{1}{8}$ to 2 inches). The bark is, externally, thin, brownish, and on the inner side yellow. Wood yellow, very hard and tough, quite difficult to powder. Odor none; taste bitter. The roots of *Berberis repens* and *Berberis nervosa* are seldom over three millimeters ($\frac{1}{8}$ inch) in diameter, while *Berberis aquifolium* is usually six to twenty-five millimeters ($\frac{1}{4}$ to 1 inch). They are equal in medicinal quality and effect.

As the name "Berberis Aquifolium" cannot be correctly applied to the roots of other plants, we have designated the drug by the general and more proper title of Berberis Oregonensis.

Constituents.—The alkaloid *berberine.*

Medicinal Uses.—Like those of other drugs containing the alkaloid berberine, as a bitter tonic and stomachic. It increases the appetite, aids digestion, and is of value in debilitated conditions of the mucous membranes of the alimentary canal, *dyspepsia*, *gastric catarrh*, etc.

Berberis Oregonensis is also said to be a tonic alterative in *syphilis*, *skin diseases*, etc.

Dose.—0.5 to 2 grams (8 to 30 grains), best given in the form of a fluid extract.

BERBERIDIS OREGONENSIS EXTRACTUM FLUIDUM.

Fluid Extract of Berberis Aquifolium.

To make 500 cubic centimeters (or its equivalent, 17 U. S. fluidounces), use 500 grams (or its equivalent, $17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of 200 grams (about $8\frac{1}{3}$ fluidounces) alcohol to every 100 grams (about $3\frac{1}{3}$ fluidounces) of water.

Dose.—0.5 to 2 cubic ctm. (8 to 30 minims).

Fig. 106½.—Barberry Bark, natural size.

Berberis Vulgaris.

Berberis Vulgaris.

Common Barberry Bark.

Origin.—*Berberis vulgaris*, Linné (*Berberidaceæ*).

Habitat.—Europe and America.

Description.—Thin slices, externally rough brownish gray, on the inner side yellow. Herbaceous odor, and a pure, very bitter taste. Colors the saliva yellow.

Constituents.—Contains two alkaloids, *berberine* and *oxyacanthine*, and some tannin.

Berberine is yellow and soluble in hot water, while *oxyacanthine* is white and insoluble in water. (See further, article "Berberina.")

Medicinal Uses.—Bitter tonic and stomachic in *atonic dyspepsia*, *chronic diarrhœa*, etc.

Dose.—Two to ten grams (30 to 150 grains), best given in fluid extract.

BERBERIDIS VULGARIS EXTRACTUM FLUIDUM.

Fluid Extract of Berberis Vulgaris.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Bergamii Oleum; U. S.

Oil of Bergamot.

Bergamiæ Ætheroleum—Volatile Oil of Bergamot.

Origin.—*Citrus Bergamia*, var. *vulgaris*, Risso et Poiteau (*Aurantiaceæ*).

Habitat.—Southern Europe.

Description.—See the Pharmacopœia, page 234.

Does not keep well. Should therefore be obtained in moderate quantities at a time, and kept in a small, well-filled, and tightly corked bottle, in a cool place.

Uses.—Only employed as a perfume for scenting hair-oils, soaps, and other toilet preparations.

Betulæ Pyroleum.

Empyreumatic Oil of Birch.

Origin.—*Betula alba*, Linné (*Betulaceæ*).

Habitat.—Europe and America.

Drug.—The empyreumatic oil obtained by destructive distillation of the bark.

Description.—A thick, brownish-red, or reddish-brown tar, having a strong persistent odor of Russia leather.

Constituents.—Volatile oil, creosote, besides most of the constituents contained in common pine tar. Its peculiar odor is due to the *volatile oil of birch*, and probably also to some *birch camphor*.

Uses.—Reputed to be remarkably beneficial as an external application in skin diseases.

Bismuthum.

BISMUTH.

Bismutum.

One of the less abundant metals. It is grayish white with a pinkish cast, crystalline, brittle enough to be readily pulverizable, fusing at 264° C., insoluble in hydrochloric acid, and in sulphuric acid (unless concentrated and warm), but readily soluble in nitric acid.

The bismuth compounds are generally insoluble in water and have a white color. Many are decomposed in the presence of water, unless free acid is present. Citrate of bismuth is, however, soluble in ammonia water.

Bismuth alloys. "*Fusible Metal.*"—A mixture of two parts bismuth, one part tin, and one part lead, melts at +94° C. (201.2° F.).

Bismuthi Citras; U. S.

CITRATE OF BISMUTH.

Bismutosus Citras—Bismuthous Citrate.

Prepared by boiling three hundred grams (10 ounces) of subnitrate of bismuth with two hundred aud ten grams (7 ounces) of citric acid, and one thousand two hundred grams (40 ounces) of distilled water until a drop of the turbid mixture makes a clear solution with water of ammonia; 15 liters (4 gallons) distilled water is then added, the precipitate is allowed to settle, and is then washed by decantation, and finally on a strainer until the washings are tasteless. The product is dried at about 40° C. (104° F.).

Description and Tests.—See the Pharmacopœia, page 54.

It is a heavy, white, odorless, and tasteless powder, insoluble in water or in alcohol, but soluble in water of ammonia.

Mainly **used** to make the soluble citrate of bismuth and ammonium.

Dose.—0.05 to 0.2 gram (1 to 3 grains).

Bismuthi et Ammonii Citras.

CITRATE OF BISMUTH AND AMMONIUM.

Bismutoso-Ammonicus Citras.

Prepared by mixing three hundred grams (10 ounces) citrate of bismuth with six hundred grams (20 ounces) distilled water, and then gradually adding water of ammonia until complete solution is effected and the liquid shows a faintly alkaline reaction. The solution is then filtered and scaled.

Description and Tests.—See the Pharmacopœia, page 55.

The scales are thin, pearly, translucent, but become opaque when exposed to the air by loss of ammonia. The preparation is odorless, has a slightly acidulous and metallic taste, and a neutral or slightly alkaline reaction. Readily soluble in water, especially by the aid of heat, but nearly insoluble in alcohol.

To prevent the loss of ammonia whereby the preparation becomes partially insoluble, it is necessary to keep it in tightly corked bottles in a cool place.

Citrate of bismuth and ammonium which has become partially insoluble by exposure or long keeping may be rendered soluble again by adding a little ammonia to the water in which it is to be dissolved. The aqueous solution of this preparation, however, never keeps long without getting cloudy unless rendered alkaline.

Medicinal Uses.—As the properties of subnitrate and subcarbonate of bismuth depend on their insolubility, and are of a mechanical nature, the use of soluble salts of bismuth for similar purposes can only be disappointing.

Dose.—0.2 to 0.3 gram (3 to 5 grains).

BISMUTHI LIQUOR.

"LIQUID BISMUTH."

Dissolve twenty-six grams (400 grains) citrate of bismuth and ammonium in five hundred cubic centimeters (17 fluidounces) hot water. Then add water of ammonia carefully until the liquid becomes clear and has a perfectly neutral reaction to litmus paper. Filter, and finally add one hundred and twenty cubic centimeters (4 fluidounces) glycerin, and enough water to make the whole product measure one thousand cubic centimeters (34 fluidounces). Each cubic centimeter of this solution contains twenty-six milligrams (or each teaspoonful about two grains) of the citrate of bismuth and ammonium.

Bismuthi Nitras.

NITRATE OF BISMUTH.

Bismutosus Nitras — Tris-nitrate of Bismuth, Neutral Nitrate of Bismuth.

Large, colorless, transparent, tabular crystals. Odor faintly acid, taste metallic. Insoluble in water, which decomposes it into subnitrate of bismuth and an acid nitrate of bismuth which remains in solution. Soluble in glycerin.

The preparation is not official in any pharmacopœia. It is obtained by evaporating a solution of bismuth in nitric acid.

BISMUTHI NITRATIS GLYCERITUM.

GLYCERITE OF NITRATE OF BISMUTH.

Dissolve sixty grams (2 ounces 50 grains) of neutral nitrate of bismuth, in clear crystals, in a sufficient quantity of glycerin to make the whole measure 240 cubic centimeters (8 fluidounces) (W. W. Moorhead).

This solution is perfectly clear, and mixes clear with cold water in all proportions.

Bismuthi Subcarbonas; U. S.

SUBCARBONATE OF BISMUTH.

Bismutosus Subcarbonas—Bismuthous Subcarbonate.

Description and Tests.—See the Pharmacopœia, page 56. A rather faintly yellowish-white powder, which is odorless, tasteless, and insoluble in water or in alcohol. The softer and finer it is the better.

Commercial metallic bismuth nearly always contains more or less arsenic, which will be found in both the subcarbonate and the subnitrate of bismuth, unless carefully separated in the process of manufacture. Hence it is necessary to test these preparations with great care, for which the Pharmacopœia gives ample directions.

Uses.—Similar to those of subnitrate of bismuth.

Dose.—One to five grams (15 to 75 grains) suspended in mucilage or syrup.

Bismuthi Subnitras; U. S.

SUBNITRATE OF BISMUTH.

Bismutosus Subnitras—Bismuthous Subnitrate.

Description and Tests.—See the Pharmacopœia, page 56. It is faintly yellowish, odorless, and tasteless. When moistened it gives

a slightly acid reaction on litmus paper. Insoluble in water or in alcohol. Should be fine and light. A coarse granular subnitrate of bismuth of nitrous odor and acid taste should be rejected. Must be free from arsenic. (See Bismuthi Subcarbonas.)

Medicinal Uses.—It is insoluble in the intestinal canal and exerts a protective action on the surface of the mucous membranes similar to that of lycopodium or starch in external excoriations and inflammations. It is given in painful affections, such as *ulcer of the stomach* or *intestines*, *gastralgia*, some forms of *dyspepsia*. Also to relieve *vomiting*, *purging*, *dysentery*, *cholera infantum*, etc. When given internally it colors the stools black. Externally it is very useful as an application in *burns*, *scalds*, *excoriations*, *fissure of the nipple*, *chafed surfaces*, as from walking, etc.

Dr. C. J. Maguire, of New York, employed subnitrate of bismuth as a topical application to the gangrenous spots in *cancrum oris*, arresting the progress of the disease and saving the patient in twenty successive cases. (*Medical Record*, N. Y., February 3, 1883.)

In some skin diseases, as *eczema* and *acne*, it has also proved of value. Used also as an ingredient of face powders. It has been recommended as an efficient remedy in *coryza*, used as a snuff.

In all these external uses it exerts the same local protective action it has in the intestines. Its use is preferable to that of subcarbonate of bismuth. Its value for these purposes depends greatly upon its fineness and lightness.

Dose.—One to five grams (15 to 75 grains) several times a day. Average dose, one gram (15 grains).

Large doses produce no deleterious effects. Sixty grams (2 ounces) have been given in one day to an adult, and more than nine grams (135 grains) have been given to a child of ten months in the same time.

A perfectly pure preparation (entirely free from arsenic) should, however, always be used.

In *gastralgia*, etc., the remedy is best taken dry in powder or wafer.

Bismuthi Tannas.

TANNATE OF BISMUTH.

Bismutosus Tannas—Bismuthous Tannate.

A yellowish powder, insoluble in water or in alcohol, and tasteless. Somewhat astringent but very rarely employed. It is used in the same manner and same doses as the subnitrate.

Bismuthi Valerianas.

VALERIANATE OF BISMUTH.

Bismutosus Valerianas—Bismuthous Valerianate.

A white powder, insoluble in water or in alcohol, having an odor of valerianic acid. Of little if any medicinal effect other than that of the subcarbonate or subnitrate of bismuth, although usually given in much smaller doses.

Dose.—0.1 to 0.25 gram (2 to 4 grains).

Bistorta.

BISTORTA.

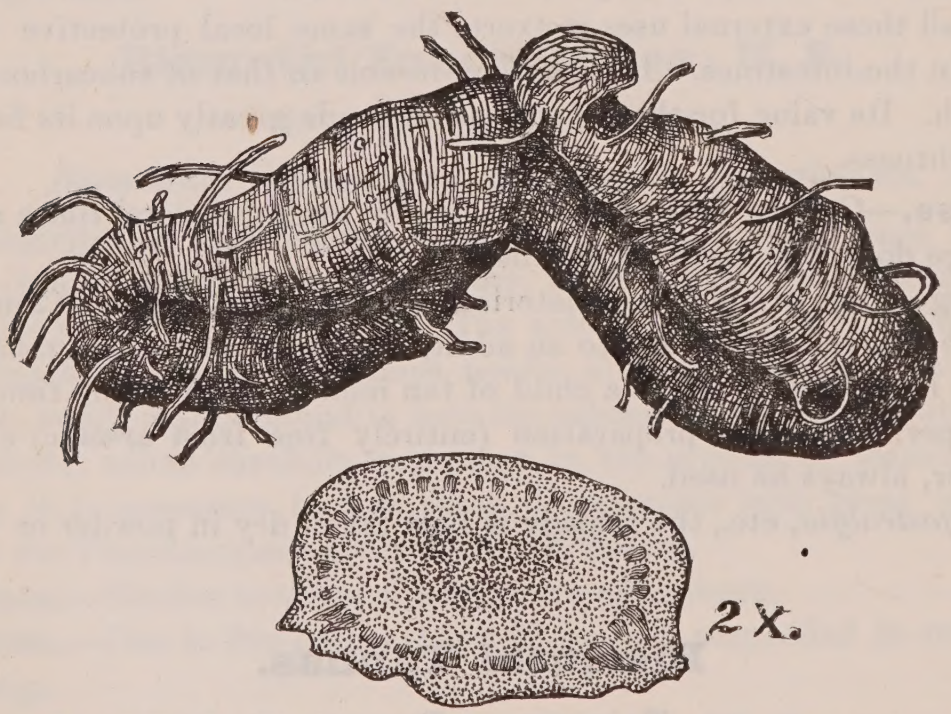
Bistortæ Rhizoma—Wiesenknöterich, Natterwurtz, G.; *Bistorte, Couleuvrine,* F.; *Bistort, Snakeweed.*

Origin.—*Polygonum Bistorta,* Linné (*Polygonaceæ*).

Habitat.—Asia, Europe, and America.

Part used.—The rhizome.

Description.—About fifteen centimeters (6 inches) long, eighteen



FIGS. 107, 108.—Bistorta, natural size; transverse section, enlarged.

millimeters ($\frac{3}{4}$ inch) broad, and ten millimeters ($\frac{1}{2}$ inch) thick; firm, bent twice upon itself (whence the name, *bis torta*), flattened on one side, plump on the other, marked by transverse rings and by scars from the rootlets; externally blackish brown; brownish red within; has a some-

what thick bark, and a large pith. Usually broken. Odor none ; taste very astringent.

Constituents.—About twenty per cent. tannin.

Medicinal Uses.—Simple astringent. Used both internally and externally.

Dose.—One to two grams (15 to 30 grains) every few hours. Best given in form of fluid extract.

BISTORTÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF BISTORTA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

Blatta.

BLATTA.—COCKROACH.

Blatta orientalis, Linné, and other species of Blatta.

Cockroaches are about twenty-five to fifty millimeters (1 to 2 inches) long, reddish-brown or blackish-brown insects, very common in warm, damp rooms, especially in kitchens. Odor offensive.

Constituents.—The cockroach contains a fetid oil, and a crystallizable substance called *antihydropin*.

Uses.—The drug has diuretic properties, and is given either in powder or in tincture.

Dose of powder about 0.25 to 0.5 gram (4 to 8 grains).

BLATTÆ TINCTURA.

TINCTURE OF BLATTA.

From sixty grams (2 ounces) cockroach, in No. 60 powder, make three hundred grams (10 ounces, or 12 fluidounces) of tincture by percolation with alcohol.

Dose.—1.5 to 3 cubic centimeters (25 to 45 minims).

Boldus.

Boldo.

Boldi Folia.

Origin.—*Peumus Boldus*, Molina (*Monimiaceæ*).

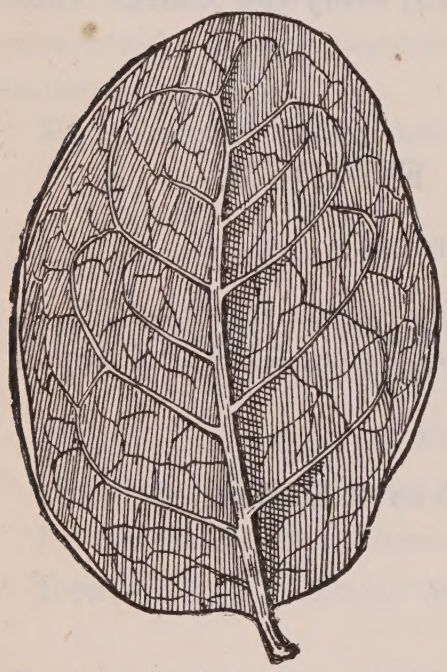


Fig. 109.—Boldo Leaf, natural size.

Habitat.—Chili.

Part used.—Leaves.

Description.—About five centimeters (2 inches) long, rough from raised glands on both sides, glossy on the upper, hairy on the under surface; brownish-green; disagreeably fragrant; taste pungent, aromatic, bitter. See Fig. 109.

Constituents.—About two per cent. volatile oil, one-tenth per cent. of the alkaloid *boldine*, some aromatic resin, tannin, etc.

Medicinal Uses.—Stimulant of the nervous system and circulation. Has been used and recommended in *anæmia* and *general debility*.

Dose.—0.05 to 0.5 gram (1 to 8 grains), best given as fluid extract.

BOLDI EXTRACTUM FLUIDUM.

Fluid Extract of Boldo.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.5 cubic centimeter (1 to 10 minims).

Boli.

Boluses.

"Boli" are spheroidal or spherical masses of solid substances incorporated with suitable excipients. They are larger than pills, weighing from forty to one hundred centigrams (6 to 15 grains) or more, and are made of a softer consistence than pills, which they resemble in all other respects. Boluses are now mainly used encased in gelatine capsules.

Bolus Alba.

White Bole.

Terra Alba.

Description.—A white soft clay, adhering to the moist tongue when brought in contact with it ; insoluble in water. It is powdered, elutriated, and made up into paste, which is formed into rolls or cakes.

Constituents.—Composed of alumina and silica, with traces of magnesia.

Uses.—Externally as an absorbent and astringent. Sometimes added to urethral injections in order to prevent the active constituent from washing out too soon, the finely powdered bole being retained in the urethra, and thus mechanically keeping a portion of the injected solution in the tube.

It is also used to remove grease spots from wood, a paste being made of the bole and applied in a layer an inch thick or less, according to the quantity of oil to be absorbed. It is very effective for this purpose, but requires to be left on the stained surface for several hours.

Bolus Armena.

Armenian Bole.

This is similar to white bole in all respects except in color, which is brown red and due to the ferric oxide it contains in addition to the constituents mentioned as making up the bolus alba.

It is used for the same purposes as the white bole, but cannot be used to remove oil from white wood, as it would leave a stain of its own.

Brayera ; U. S.

Brayera.

Brayeræ Flores—Kousso, Kooso, Koosso, Cousso, Cusso, Cosso.

Origin.—*Brayera anthelmintica*, Kunth (*Rosaceæ*).

Habitat.—Abyssinia.

Part used.—The female flowers.

Description.—See the Pharmacopœia, page 57.

In the trade distinction is made between the "Red Kousso," which is the best (and the kind described in the Pharmacopœia), and the "Brown Kousso," which is mixed with male flowers. In *Red Kousso* the sepals (leaf-like parts of the outer envelopes of the flowers) are reddish ; in *Brown Kousso* they are greenish or brownish, and smaller than in the former variety.

FIG. 110.—Bundle of Brayera, reduced to one-third natural size.

Must consist of tolerably well preserved clusters without the coarse stems; not of crushed flowers with pieces of the stem. The odor, though faint, reminds of elder-flowers. The taste is slight at first, but afterward becomes bitter and somewhat acrid.

Constituents.—The principal constituent is *koussin*, a resinous, white or yellowish, odorless substance of bitter taste and acid reaction. It is soluble in boiling alcohol, but not in water. There has also been found in brayera about twenty-four per cent. of tannin and traces of volatile oil, valerianic and acetic acid, etc.

Medicinal Uses.—Brayera is used as a tænicide. It is not as reliable as some other remedies in expelling the tapeworm, as it often fails to bring out the head. It also produces much distress, and is gradually falling into disuse in consequence.

Dose.—Eight to fifteen grams (2 to 4 drachms), in infusion or mixed with honey or syrup.

BRAYERÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF BRAYERA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Moisten the drug with two hundred grams (about 8⅓ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce repre-

sents four hundred and fifty-five and two-thirds grains; and each fluidrachm nearly fifty-seven grains.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

BRAYERÆ INFUSUM; U. S.

INFUSION OF BRAYERA.

Infusion of Kousso.

Pour two hundred and fifty cubic centimeters (17 fluidounces) of boiling water on fifteen grams (½ avoirdupois ounce) of brayera, in No. 20 powder, and macerate in a covered jar until cool.

Dispense the infusion without straining it.

To be taken at one dose.

FIGS. 111–116. — Brayera. *a*, section of flower, with fruit partly matured; *b*, pistil; *c*, section of female flower, abortive anthers; *d*, male flower; *e*, female flower; *f*, flower-bud of male flower; all enlarged.

Bromum; U. S.

BROMINE.

Brominium, Phar. 1870—*Brom,* G. and Sw.; *Brôme,* F.; *Bromo,* Sp.

Description and Tests.—See the Pharmacopœia, page 57.

Must be kept in small bottles, not more than two-thirds filled, closed by well-ground glass stoppers, and put in a cool place.

Bromine must be handled with great caution, as its vapors are suffocating, extremely irritating, and poisonous. In cases of accident, when severe exposure to bromine vapors results from breaking a bottle, or otherwise, the face and hands may be bathed with alcohol and then washed with castile soap and water.

Medicinal Uses.—It has been used in cases in which iodine was known to be beneficial. It is disinfectant.

It is sometimes applied in solution, with several times its own volume of alcohol, in *cancer, cancer of the womb, gangrene,* etc. The application is painful.

It is not used internally except in combination, as in bromides, etc.

BROMINE SOLUTION.

Dissolve two grams (30 grains) bromine and four grams (62 grains) bromide of potassium in two hundred cubic centimeters (6¾ fluidounces) of water.

Used externally for cauterizing ugly *ulcers,* etc.

STRONGER BROMINE SOLUTION.

For Surgical Use.

Dissolve sixty grams (2 ounces) bromine and twenty grams (⅔ ounce) potassium bromide in three hundred cubic centimeters (10 fluidounces) water.

Used as a caustic.

Bryonia; U. S.

BRYONIA.

Bryoniæ Radix—Gichtwurzel, Zaunrübe, Gichtrübe, G.; *Bryone, Couleuvrée*, F.; *Brionia, Nueza*, Sp.; *Bryonia*, Sw.

Origin.—*Bryonia alba* and *Bryonia dioica*, Linné (*Cucurbitaceæ*).

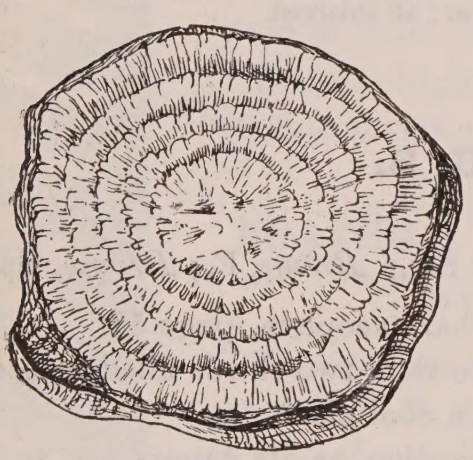


FIG. 117.—White Bryony, natural size.

Habitat.—Europe.

Part used.—The root.

Description.—See the Pharmacopœia, page 57.

Must be recently dried. An old drug is useless.

The fresh ("green") root has also been used, and is by some held to be more active. The fresh plant contains some acrid substance which blisters the skin.

Constituents.—Contains the glucoside *bryonin*, which has been obtained in pearly crystals, having a bitter, acrid taste, or in white powder. It is soluble in water and in alcohol, but insoluble in ether.

Medicinal Uses.—This drug is a drastic cathartic, and is used in cases in which jalap would be also indicated. It was at one time used quite frequently, then became entirely obsolete, and only of late years has come into use again.

It has been used in *dropsies, chronic constipation, hypochondriasis, epilepsy, mania*, etc.

It is said to have acted well in *paralysis of the rectum* and *bladder*.

It is sometimes emetic in large doses, but this effect is uncertain.

Externally the bruised fresh root has been used in *chronic skin diseases*.

Dose of the powder, 0.5 to 4 grams (10 to 60 grains).

BRYONIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF BRYONIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.5 to 4 cubic centimeters (10 to 60 minims).

BRYONIÆ TINCTURA; U. S.

TINCTURE OF BRYONIA.

Moisten one hundred grams (3 ounces 230 grains) recently dried bryonia, in No. 40 powder, with one hundred grams (4⅛ fluidounces) of alcohol, and macerate twenty-four hours; then pack firmly in a cylindrical percolator, and percolate with alcohol until one thousand grams (or about 40 fluidounces) of tincture has been received.

Dose.—Five to twenty-five cubic centimeters (1 to 6 fluidrachms), beginning with the smaller doses.

Buchu; U. S.

BUCHU.

Buchu Folia, Barosmæ Folia—Buckublätter, Buccoblätter, G.; *Feuilles de bucco*, F.; *Buckoblad*, Sw.

Origin.—*Barosma betulina*, Bartling; *Barosma crenulata*, Hooker; and *Barosma serratifolia*, Willdenow (*Rutaceæ*).

Habitat.—Southern Africa.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 58.

The leaves of the two first named species constitute the so-called "Short Buchu," and those of the third are the "Long Buchu."

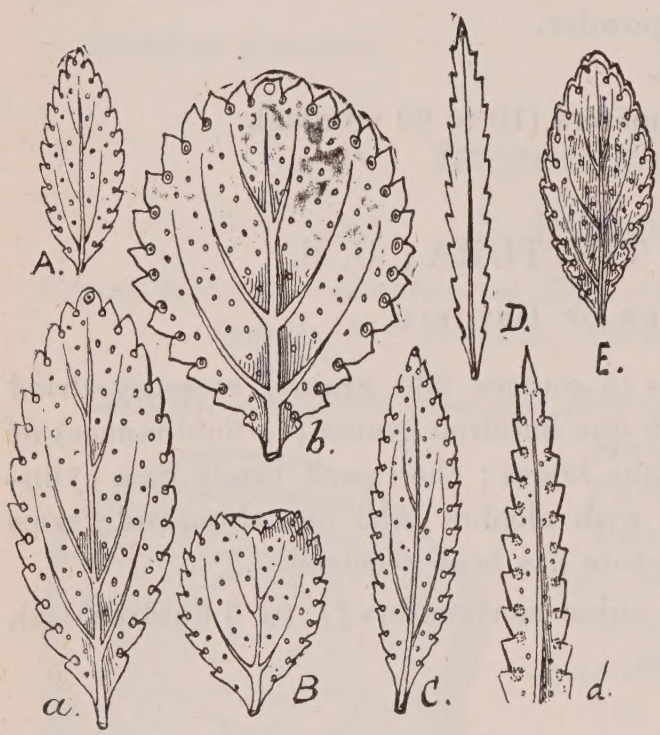
Short buchu and long buchu are sold separately. Long buchu is the dearer, but is certainly less active, as it contains less of the active principle—volatile oil—than the short buchu.

Both kinds usually require careful garbling. The impurities in short buchu are readily detected and separated. In long buchu, however, are sometimes found the leaves of Empleurum serrulatum, which appear

like the true buchu leaves until more carefully examined. All are here figured, full size.

True buchu leaves have conspicuous oil glands on the under surface and margin.

Short buchu is pale yellowish-green; long buchu green. In both kinds the leaves are paler on the under side.



FIGS. 118–125.—*A*, leaf of barosma crenulata, natural size; *a*, enlarged; *B*, leaf of barosma betulina, natural size; *b*, enlarged; *C*, leaf of barosma serratifolia; *D*, leaf of empleurum serrulatum; *d*, enlarged; *E*, leaf of barosma crenata.

Buchu has a very strong, mint-like odor, and a bitter pungent taste, reminding of spearmint.

Constituents.—The active constituent is a volatile oil, of which Bedford found two-thirds per cent. in long buchu, and one and one-fifth per cent. in short buchu. Allen and Hanbury found 1.63 per cent. in the latter.

The deep green coloring matter is chiefly chlorophyll. There is also much vegetable mucilage in buchu. *Barosma camphor* is a white crystalline body which deposits from the volatile oil of buchu in cold.

Medicinal Uses.—Buchu is an aromatic stimulant and stomachic, increasing the appetite and digestion, but it is seldom used for this purpose.

It is frequently given in *chronic catarrhs* of the urinary organs, in *cystitis*, *pyelitis*, and *urethritis*.

Dose.—1.33 to 2.66 grams (20 to 40 grains), in powder or in infusion. The best form of administering this drug is the fluid extract.

BUCHU EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF BUCHU.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water, mixed in the proportion of

two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 5 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-third grains; and each fluidrachm nearly fifty-seven grains.

Dose.—One to two cubic centimeters (15 to 30 minims).

BUCHU INFUSUM.

Infusion of Buchu.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 597.)

About the same strength as the preparation of 1870.

Dose.—About twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

BUCHU TINCTURA.

Tincture of Buchu.

Percolate two hundred grams (7 ounces 24 grains) buchu, in No. 60 powder, with a menstruum composed of two parts alcohol and one part water, until one thousand grams (about 38 fluidounces) percolate has been obtained.

This is an ineligible form for the administration of buchu, as the cases in which this drug is indicated are usually such that large doses of alcohol are inadmissible or productive of harm. It contains too much alcohol and too little buchu.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Butyrum.

BUTTER.

Butter, G.; *Beurre*, F.; *Smör*, Sw.

Unsalted fresh butter is an excellent base for ointments. Must have a neutral reaction, a pure, sweet odor, and mild taste.

Consists of about thirty per cent. olein, sixty-eight per cent. palmitin and stearin, and the glycerides of butyric and other fatty acids.

Medicinal Uses.—Butter may be given in large quantities in cases in which cod-liver oil is indicated but cannot be tolerated by the stomach.

Cadmium.

CADMIUM.

A metal sometimes accompanying zinc in the ores. It is tin white, malleable, soluble in nitric acid. Its salts are generally white. The chloride, iodide, and sulphate are soluble salts.

Cadmii Iodidum.

IODIDE OF CADMIUM.

White, handsome, pearly, scale-like crystals, soluble in somewhat more than their own weight of water, and also soluble in alcohol.

CADMII IODIDI UNGUENTUM.

OINTMENT OF IODIDE OF CADMIUM.

Mix fifteen grams ($\frac{1}{2}$ ounce) cadmium iodide with one hundred and fifty grams (5 ounces) petroleum ointment.

Used in skin diseases. Does not color the skin.

Cadmii Sulphas.

SULPHATE OF CADMIUM.

Large colorless crystals. It dissolves in one and one-half times its weight of water.

Used externally as an astringent in the same manner as sulphate of zinc. It is more powerful than the latter.

Caffea.

COFFEE.

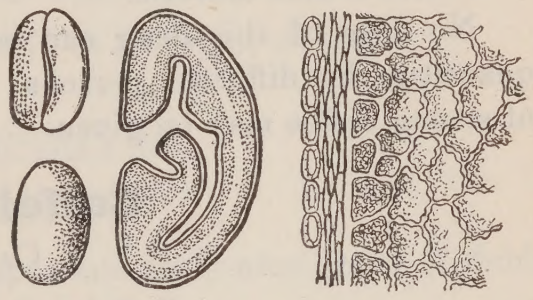
Caffeæ Semina—Kaffee, G.; *Café*, F.; *Kaffe*, Sw.

Origin.—*Coffea arabica*, Linné (*Rubiaceæ*).

Habitat.—Cultivated in most tropical and subtropical countries.

Part used.—The seeds.

Description.—Plano-convex, oval, with a groove through the length of the flat side, to which pieces of the thin brownish-yellow shell may be seen attached. Odor peculiar. Taste of unroasted seeds bitter.



FIGS. 126–128.—Coffee, natural size, transverse section enlarged, and section of seed-coats more highly enlarged.

Varieties.—*Mocha coffee*, grown in Arabia, consists of very small "grains," of dark color, and very plump. It has a fine flavor and is much esteemed; but is usually employed mixed with Java or some other variety of coffee. *Rio coffee* is also comparatively small and dark colored, but not so plump as Mocha, and has when prepared for use, as well as unroasted, a peculiar flavor, stronger than that of any other kind, and not so delicate. *Java coffee*, with large, flattish, light-colored grains, has a fine delicate flavor. *Maracaibo coffee* resembles the Java. *Liberia coffee*, which has the largest seeds of all, is also light colored, and has a fine flavor.

Constituents.—About four-fifths per cent. of Caffeine (which see). Also caffeo-tannic acid, about thirteen per cent. fixed oil, a trace of volatile oil, etc.

Roasting.—To roast coffee properly is no small art. It must be roasted as rapidly as possible without burning. The heat must be thoroughly under control and sufficient to evenly and fully *brown* the seeds, but not hot enough to blacken them. If the coffee is not browned sufficiently, the product will have a disagreeable, insipid, somewhat bitter taste; if burnt, the coffee will have none of its peculiar, fine aroma, and will be bitter. When browned properly, the seeds have a shining, rich, dark brown color, which is uniform all through the lot, and have an agreeable, fragrant odor.

To extract the flavor and properties from the roasted coffee, it must be ground fine, and exhausted with boiling hot water by percolation, to obtain a strong extract such as pharmacists require for flavoring soda-water syrup.

Uses.—Coffee is used as a daily drink by a large portion of the

human race. It moderates tissue waste, improves digestion, produces mental exhilaration and physical activity. It should not be taken at other times than with meals, nor in excessive quantities, as it may otherwise produce nervous derangements, disturbance of the digestion, hepatic troubles, insomnia, etc.

On account of its stimulant effects it is used in various diseases, but especially in such as are apt to be accompanied by stupor and cerebral depression, as in *typhoid conditions*, in *alcoholic intoxication*, and in *opium-poisoning*.

Coffee is also diuretic.

No dose of this drug can be stated, as it is employed in various quantities by different persons. In opium-poisoning large quantities of strong coffee may be given.

Caffeina; U. S.

CAFFEINE.

Caffeia, Coffeinum, Coffein.

Description and Tests.—See the Pharmacopœia, page 58. It is a feeble alkaloid. Exists in the seeds and leaves of the *coffee* plant, in *tea* leaves, *guarana* (seeds), *maté* leaves (*Ilex paraguayensis*), *yaupon* leaves (*Ilex cassine*), *cola* nuts (seeds of *Cola acuminata*), the leaves of *Cyclopia genistoides*, and the leaves of *Neea theifera*.

It is usually prepared from tea or guarana. It can also be made synthetically from *guanin*, a substance existing in guano.

Medicinal Uses.—Caffeine is used for the same purposes as coffee, but probably with less beneficial results.

Caffeine has been given as a diuretic.

Valerianate of caffeine has been given in *hysterical vomiting* and *whooping-cough*.

Caffeine has been used for subcutaneous injection, with questionable success or with positive failure, in *hemicrania*, *hysterical headaches*, *occipital neuralgia*, and in *opium-poisoning*.

Dose.—One to three grains (0.06 to 0.20 gram) in sweetened water.

Caffeinæ Citras.

CITRATE OF CAFFEINE.

A white, light, silky, flexible, crystalline mass. Soluble in sixty parts of water, and in greater proportion in diluted alcohol.

Medicinal Uses.—Diuretic. Employed in *cardiac dropsy*.

Dose.—0.05 to 0.3 gram (1 to 5 grains); average dose about 0.2 gram (3 grains).

Cajuputi Oleum; U. S.

OIL OF CAJUPUT.

Cajuputi Ætheroleum; Volatile Oil of Cajuput.

Origin.—*Melaleuca Cajuputi*, Roxburgh (*Myrtaceæ*).

Habitat.—The Molucca Islands.

Description.—See the Pharmacopœia, page 234. Bluish-green.

Medicinal Uses.—Probably very rarely used. Is said to be, and probably is, a stimulant carminative like other volatile oils.

Dose.—0.1 to 0.5 cubic centimeter (2 to 8 drops), on sugar.

CAJUPUTI SPIRITUS.

SPIRIT OF CAJUPUT.

Mix one gram (15 grains) oil of cajuput and forty-nine grams (2 fluid-ounces) alcohol.

Used like oil of cajuput.

Dose.—One to ten cubic centimeters (15 to 150 minims) diluted with water.

Calamus; U. S.

CALAMUS.

Calami Rhizoma, Radix Acori—Kalmuswurzel G.; *Acore vrai, Acore odorant*, F.; *Acoro, Acoro verdadero*, Sp.; *Kalmusrot*, Sw.; *Sweet Flag.*

Origin.—*Acorus Calamus*, Linné (*Araceæ*).

Habitat.—Europe and North America.

Part used.—The unpeeled rhizome.

Description.—See the Pharmacopœia, page 58.

Unpeeled root (rhizome) is the only kind to be used. The peeled calamus is very handsome, especially when bleached, but it is much less active medicinally, and when bleached (with chlorinated lime or sulphurous acid) utterly unfit for use.

The thickness of the part on the outer side of the nucleus sheath (sometimes erroneously called "bark") should be over one-half the shortest diameter of the portion included within the nucleus sheath. The oil cells are visible only by the aid of a microscope, and are more numerous in the outer than in the inner part.

The odor is strong and aromatic; the taste acrid, bitter, aromatic.

Constituents.—The drug contains *volatile oil* and *acorin*, which

is a bitter glucoside (possibly an alkaloid) containing nitrogen. The oil, of which there is about one per cent. in the nucleus sheath, but only one-fourth per cent. in the peeled root, is yellow, or yellowish-brown, and has the odor and taste of the drug. The *acorin* is a yellowish-brown, soft, resinous-looking mass. Flückiger got crystals from the tannin precipitate. Acorin is insoluble in water, but soluble in alcohol or in ether. There is also some benzoic acid in calamus, besides starch, etc.

FIGS. 129, 130.—Calamus, upper and lower surfaces, natural size.

Medicinal Uses.—A valuable aromatic stomachic, often used in combination with bitters as an appetizer in *flatulent dyspepsia*, etc. It is an ingredient of almost all of the popular "bitters" of the day.

It is best given in the form of fluid extract or in infusion.

CALAMI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF CALAMUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and seventy-five grams (about 7⅓ fluidounces) of the menstruum.

Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to

make the whole measure five hundred cubic centimeters (or 17 fluidounces).

For suggestions as to details, see page 451.

Dose.—One to five cubic centimeters (15 to 75 minims).

CALAMI INFUSUM.

INFUSION OF CALAMUS.

Prepared by infusing thirty grams (1 ounce) cut unpeeled calamus in three hundred cubic centimeters (10 fluidounces) boiling water, about a quarter of an hour, and then straining.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

CALAMI TINCTURA.

TINCTURE OF CALAMUS.

Prepared by percolating thirty grams (1 ounce) calamus in No. 60 powder with alcohol until three hundred cubic centimeters (10 fluidounces) tincture has been obtained.

Dose.—Four to fifteen cubic centimeters (1 to 4 fluidrachms).

Calcium.

CALCIUM.

An alkaline earth metal, the carbonate and sulphate of which are abundant, forming whole mountain ranges. Calcium phosphate is the principal constituent of bone. Calcium carbonate makes up the shells of oysters, etc.

Calcium salts are colorless or white. Many of them are insoluble in water, as the carbonate, phosphate, oxalate. Sulphate dissolves only to a very limited extent. Nitrate, chloride, bromide, and iodide are readily soluble.

Calcii Bromidum ; U. S.

BROMIDE OF CALCIUM.

Calcicum Bromidum—Calcium Bromide.

Description and Tests.—See the Pharmacopœia, page 59. White, granular, deliquescent ; soluble in less than its own weight of water.

Preservation.—Must be kept in tightly glass-stoppered bottles.

Medicinal Uses.—The same as of other alkaline bromides. Said to act more promptly in *epilepsy.*

Dose.—One to two grams (15 to 30 grains). Best given in syrup.

Calcii Bisulphis.

Bisulphite of Calcium.

Calcicus Bisulphis—Calcium Bisulphite.

A nearly white, amorphous salt, usually occurring in a lumpy powder ; of a somewhat sulphurous odor and taste ; soluble to some extent in hot water.

Uses.—See Calcii Sulphis.

Calcii Carbonas Præcipitatus ; U. S.

Precipitated Carbonate of Calcium.

Calcicus Carbonas Præcipitatus—Precipitated Calcium Carbonate, Precipitated Carbonate of Lime.

Description and Tests.—See the Pharmacopœia, page 59. A white, impalpable powder ; odorless, tasteless, insoluble in water and in alcohol.

Medicinal Uses.—Antacid and astringent. Used internally to check *diarrhœa*, especially if the stools are acid and frothy and there are sour eructations.

Dose.—0.5 to 5 grams (8 to 75 grains), suspended in mucilage and syrup or in powder.

Calcii Chloridum ; U. S.

Chloride of Calcium.

Calcicum Chloridum—Calcium Chloride, Fused Chloride of Calcium.

Description and Tests.—See the Pharmacopœia, page 60. White or nearly colorless, somewhat translucent pieces ; very deliquescent ; odorless ; acrid. Two hundred grams will dissolve in three hundred grams of water ; solubility in boiling water unlimited.

Preservation.—On account of its deliquescent nature it must be kept in tightly corked or glass-stoppered bottles, tied over with bladder or otherwise snugly capped.

Uses.—Employed in chemical processes to dry gases and salts, and for the preparation of other calcium salts.

In medicinal doses it is given to reduce *scrofulous glandular swellings* and in various *skin diseases*. In large doses it produces gastro-intestinal irritation and inflammation.

Dose.—0.5 to 1 gram (8 to 15 grains), largely diluted in water or mucilaginous drinks.

Calcii Hypophosphis ; U. S.

HYPOPHOSPHITE OF CALCIUM.

Calcicus Hypophosphis—Calcium Hypophosphite, Hypophosphite of Lime.

Description and Tests.—See the Pharmacopœia, page 60. Snowy white, small, crystalline scales ; odorless ; bitter ; dissolves in six times its own weight of water. Heat scarcely aids its solution.

Medicinal Uses.—Considered to be of value in *nervous depression* and *exhaustion, cachectic* and *debilitated conditions, anæmia, scrofula, tuberculosis, rickets, caries,* etc.

Dose.—0.3 to 0.5 gram (5 to 8 grains) three times a day. Best given on a full stomach or at meal-times.

CALCII HYPOPHOSPHITIS SYRUPUS.

SYRUP OF HYPOPHOSPHITE OF CALCIUM.

Syrup of Hypophosphite of Lime.

Dissolve twenty-five grams (386 grains) hypophosphite of calcium in five hundred cubic centimeters (17 fluidounces) of boiling distilled water, and filter. In the filtrate dissolve seven hundred and fifty grams (26½ ounces) sugar, and then add thirty cubic centimeters (1 fluidounce) orange-flower water, and enough water to make the whole measure one thousand cubic centimeters (34 fluidounces). Filter.

Dose.—A teaspoonful (5 cubic centimeters) containing thirteen centigrammes (2 grains) hypophosphite of calcium.

Calcii Iodidum.

IODIDE OF CALCIUM.

Calcicum Iodidum—Calcium Iodide, Iodide of Lime.

White, crystalline, usually occurring in irregular pieces of the fused salt, deliquescent, soluble in one-half its weight of water ; odorless, bitter.

Medicinal Uses.—Given internally as an alterative and antiseptic to reduce *suppuration,* etc.

Dose.—0.05 to 0.3 gram (1 to 5 grains).

CALCII IODIDI SYRUPUS.

SYRUP OF IODIDE OF CALCIUM.

Dissolve twenty-five grams (386 grains) iodide of calcium in five hundred cubic centimeters (17 fluidounces) boiling water, and filter. Add six hundred grams (21½ ounces) sugar, fifteen cubic centimeters (½ fluidounce) tincture of vanilla, and enough water to make the whole measure one thousand cubic centimeters (34 fluidounces). Dissolve the sugar and filter the syrup.

Dose.—A teaspoonful (5 cubic centimeters), containing about thirteen centigrams (2 grains) of calcium iodide.

Calcii Lactophosphatis Syrupus; U. S.

SYRUP OF LACTOPHOSPHATE OF CALCIUM.

Syrup of Lactophosphate of Lime.

Mix twenty-two grams (340 grains) precipitated phosphate of calcium with three hundred cubic centimeters (10 fluidounces) cold water, and then add just enough hydrochloric acid to dissolve the whole of the phosphate. Filter the solution through paper. Dilute the filtrate with twelve hundred cubic centimeters (40 fluidounces) cold water, and then add, gradually, enough ammonia water to impart a slight but permanent odor of ammonia to the liquid. Throw the whole liquid on a fine muslin strainer, previously well wetted with water. When the liquid has drained off, put the magma-like precipitate in a jar, mix it with another twelve hundred grams (40 fluidounces) cold water, and then again transfer it to the muslin strainer. When the liquid has drained away, mix the magma with thirty-three grams (1 ounce 72 grains) lactic acid, and stir until all is dissolved. Now add eighty grams (2⅔ fluidounces) orange-flower water and enough distilled water to make the whole weigh three hundred and fifty grams (12 ounces 150 grains), filter, and add sufficient water through the filter to make the whole filtrate weigh four hundred grams (14 ounces 48 grains). To this add six hundred grams (21 ounces 100 grains) sugar, and dissolve the latter by shaking, without the aid of heat, and finally strain or filter.

This preparation does not contain any definite compound of calcium phosphate with lactic acid, but is simply a flavored syrup containing calcium phosphate held in solution by free lactic acid. There is no such compound known to chemistry as "lactophosphate of calcium" or lactophosphate of lime." Prepared as directed by the Pharmacopœia it soon gets unclear and mouldy. Should therefore be freshly made.

Medicinal Uses.—Same as those of the phosphate of lime.

Dose.—About five cubic centimeters (1 teaspoonful).

Calcii Phosphas Præcipitatus; U. S.

PRECIPITATED PHOSPHATE OF CALCIUM.

Calcicus Phosphas Præcipitatus—Precipitated Calcium Phosphate, Precipitated Phosphate of Lime.

Description and Tests.—See the Pharmacopœia, page 60. A fine, white, odorless, and tasteless powder, insoluble in water and in alcohol, but soluble in dilute hydrochloric acid.

Pharmaceutical Uses.—As a filtering medium for neutral, aqueous, or alcoholic liquids containing volatile oils, etc., it is generally effective, and much to be preferred to magnesium carbonate.

Medicinal Uses.—Occasionally prescribed in *rickets, caries, ununited fractures*, etc.; also in *tuberculosis*, with the hope of bringing about calcareous degeneration of the tubercles.

In ill-nourished pregnant females the teeth are often absorbed to furnish calcareous salts for the formation of bone for the fœtus. To prevent this, lime preparations are often given, and this is a good preparation for the purpose.

Dose.—0.5 to 2 grams (8 to 30 grains).

Calcii Sulphas Ustus.

CALCINED SULPHATE OF CALCIUM.

Calcicus Sulphas Ustus—Anhydrous Calcium Sulphate, Gypsum, Plaster-of-Paris.

A white, amorphous powder, which when stirred up with some water to form a thin paste sets to a hard solid mass in from two to five minutes.

Must be kept in well-corked bottles, in a dry place.

Uses.—Employed for making plaster-of-Paris bandages, plaster-of-Paris jackets, etc.

Mixed with flour and sugar it is sometimes used as a rat poison. Water is placed in accessible places, and the rats, after eating and drinking, perish on account of the solid mass which forms in their stomachs and intestines.

Calcii Sulphis.

SULPHITE OF CALCIUM.

Calcicus Sulphis—Calcium Sulphite.

A white, or nearly white, powder, without odor, but having a somewhat sulphurous taste; it is soluble in eight hundred parts water.

Medicinal Uses.—Probably seldom used internally. It prevents fermentation and suppuration. It is used to prevent the former process in cider, fruit juices, wines, etc.

Calcis Linimentum; U. S.

LIME LINIMENT.

Equal parts by weight of lime-water and cotton-seed oil, shaken well. It has the appearance of a thick cream.

The lime liniment of the Pharmacopœia of 1870 consisted of eight fluidounces lime-water and seven troyounces of linseed oil. Lime liniment made with linseed oil is called *Carron Oil.* In the British Pharmacopœia the lime liniment consists of equal parts by volume of lime-water and olive oil. In the French and Belgian Pharmacopœias oil of sweet almond is used, and forms a preferable mixture.

Medicinal Uses.—A proper application in burns and scalds.

Calcis Liquor; U. S.

SOLUTION OF LIME.

Calcici Hydratis Solutio—Solution of Calcium Hydrate; Aqua Calcis, Aqua Calcariæ—Lime-Water, E.; *Kalkwasser,* G.; *Eau de chaux,* F.; *Aqua de cal,* Sp.; *Kalkvatten,* Sw.

Slake thirty grams (1 ounce) lime with about one hundred and eighty grams (6 fluidounces) water gradually added. Then add nine hundred cubic centimeters (about two pints) more water. Stir the mixture occasionally during half an hour. Then allow it to settle, decant the water which separates and throw it away. Now add to the remaining magma 9 liters (about 19 pints) distilled water, stir well, and after the coarser and heavier particles of solid matter have subsided, pour off the milky mixture together with the suspended, undissolved, but finely divided lime into a glass-stoppered bottle, which is then to be closed and set aside. When lime-water is wanted for use, pour off the clear solution from the sediment.

It is clear, colorless, nearly odorless, has a specific gravity of 1.0015 at 15° C. (29° F.), and contains 0.15 per cent. of calcium hydrate.

Medicinal Uses.—Lime-water is a valuable addition to drinks, especially milk, in cases of *diarrhœa* due to gastro-intestinal irritation caused by acid fermentation, such as is met with so frequently in children during the hot summer months. The milk for bottle-nursed children should contain one-third or one-fourth part of lime-water. The caseous coagula are more flocculent than when cow's milk is given with-

out this addition. It is also used in *vomiting*, *chronic diarrhœa*, *thrush*, and in the ailments of ill-nourished infants and children. In *vomiting* due to ulcer or cancer of the stomach it is often very useful. In *rickets* it supplies the necessary lime for the formation of hard bone. The continued inhalation of spray of lime-water and of vapors from slaking lime has been employed with good results for loosening membranous deposits in *croup* or *diphtheria*.

Dose.—Twenty-five to two hundred and fifty cubic centimeters (1 to 8 fluidounces) several times a day with milk.

Calcis Syrupus; U. S.

SYRUP OF LIME.

Calcis Liquor Saccharatus—Saccharate of Lime, Saccharated Lime, Saccharated Solution of Lime.

Triturate fifty grams (1 ounce 334 grains) lime with three hundred grams (10 ounces 255 grains) sugar in a Wedgewood mortar until intimately mixed; then put five hundred grams (or 17 fluidounces) boiling water in a bright copper or tinned iron vessel, add the mixture of lime and sugar, and boil the whole together for five minutes, stirring constantly. Now add five hundred grams (or 17 fluidounces) more of water, and then filter through paper. Lastly evaporate the syrupy liquid until it weighs one thousand grams (35 ounces 120 grains).

A clear, thin syrup, containing about one per cent. of lime.

Medicinal Uses.—Same as of phosphate of lime.

Dose.—About five cubic centimeters (1 teaspoonful).

Calx; U. S.

LIME.

Calcicum Oxidum—Calcium Oxide—Calx Usta, Calx Viva, Calcaria Usta—Kalk, Gebrannter Kalk, G.; *Chaux, Chaux Vive*, F.; *Cal, Cal Viva*, Sp.; *Kalk, Bränd Kalk*, Sw.; *Quick-lime, Unslaked Lime.*

Description and Tests.—See the Pharmacopœia, page 61.

Good "quick-lime," or "unslaked lime." Unless kept in tight vessels in a dry place it absorbs moisture and carbonic acid from the air, falls to powder, and is then "air-slaked."

Odor faint, if any. Taste sharp and caustic. Soluble in seven hundred and fifty parts of water at ordinary temperatures; much less soluble in boiling water. Insoluble in alcohol.

Absorbs about half its weight of water to form hydrate (*slaked lime*).

Lime which is very hard and apparently remains unacted upon by cold water may, nevertheless, be slaked by hot water. A great amount of heat is generated by the chemical action in slaking lime.

Uses.—Generally used only for the preparation of lime compounds.

An ointment containing five per cent. of quick-lime has been found useful in *chronic psoriasis* and other *skin diseases* and *ulcers.*

Calx Chlorata; U. S.

CHLORINATED LIME.

Calx Chlorinata, Calcaria Chlorata, Calcii Hypochloris—Chlorkalk, Bleichkalk, G.; *Chlorure de chaux, Poudre de Tennant, Poudre de Knox,* F.; *Hipoclorito calcico clorurado, Cloruro de Cal,* Sp.; *Klorkalk,* Sw.; *Chloride of Lime, Bleaching Powder, Hypochlorite of Lime.*

Description and Tests.—See the Pharmacopœia, page 62.

Chlorinated lime is commonly called "Chloride of Lime." It should be a white, or nearly white, dry powder, containing at least twenty-five per cent. "available chlorine." By *available chlorine* is meant the total amount of free chlorine obtained when the chlorinated lime is mixed with an acid. The Pharmacopœia provides a simple reliable test by which an insufficiency of chlorine may be discovered. Must be kept in tightly closed vessels, in a cool but especially a dry place, and protected from sunlight.

Medicinal Uses.—It is mainly employed as a disinfectant for privies, water-closets, sewers, and to remove the foul odors caused by cancer of the uterus, gangrene, etc. Internally it has been given in *septic* and *typhoid fevers, putrid sore throat,* etc.

Dose.—0.05 to 0.2 gram (1 to 5 grains) in solution, six to ten times a day.

As a gargle in sore throat a one per cent. solution may be prescribed.

Calx Sulphurata; U. S.

SULPHURATED LIME.

Sulphide of Lime, Sulphuret of Lime, Sulphide of Calcium.

It is a mixture of sulphide of calcium and hyposulphite and sulphate of calcium. When physicians prescribe sulphide of calcium, this preparation is understood to be the one intended.

Preparation.—It is prepared by thoroughly mixing three hundred grams (10 ounces) finely powdered lime and two hundred and seventy

grams (9 ounces) precipitated sulphur, packing the mixture with moderate pressure into a Hessian crucible of such size that it will be nearly filled, luting down the cover, and heating at a low red heat for an hour in a charcoal fire.

Description and Tests.—See the Pharmacopœia, page 62. It is a grayish or yellowish white powder which smells somewhat of hydrosulphuric acid ("sulphuretted hydrogen"), and has an offensive caustic taste, and alkaline reaction. It is not readily soluble in water and quite insoluble in alcohol. Must be kept in tightly corked bottles.

Medicinal Uses.—This substance is given to arrest or prevent the formation of pus in diseases of all grades of severity from the slight pustule of *acne* to the confluent pustules of *small-pox*, the discharge of *pus from the ear* or in *purulent bronchorrhœa*, or *abscesses*, as in *boils*, *abscess of the liver*, or *lumbar abscesses*.

Dose.—0.01 to 0.25 gram ($\frac{1}{6}$ to 4 grains) in pills or granules, repeated several times daily.

CALCIS SULPHURATÆ LIQUOR.

Solution of Sulphurated Lime.

Boil one hundred grams (3 ounces 230 grains) sublimed sulphur and two hundred grams (7 ounces 24 grains) lime with one thousand cubic centimeters (34 fluidounces) water in a porcelain evaporating dish for one hour, stirring occasionally with a glass rod, and adding more water from time to time to preserve the same volume. Remove the dish from the heat, let the contents settle, decant the clear solution, and keep it in well-corked or glass-stoppered bottles, well filled and put in a cool place.

Medicinal Uses.—Employed externally as a wash in *skin diseases*.

Calculi Cancrorum.

Crabs' Eyes.

Lapilli Cancrorum—Crabs' Stones.

White, about the size of a pea, round, somewhat flattened, smooth, with the convex edge raised all around above the plane surface so as to form a pit or groove on the flat side. Composed of concentric layers of organic membrane containing deposits of calcium carbonate, and other calcium salts. Inodorous and tasteless. When put into boiling water they turn rose colored. Hydrochloric acid dissolves out the calcium salts, leaving the organic framework. Contains about sixty-three

per cent. calcium carbonate, seventeen per cent. calcium phosphate, from twelve to fifteen per cent. animal matter, etc.

Medicinal Uses.—Sometimes employed, like carbonate of lime, as an antacid. The practice of introducing them under the eyelids to remove foreign bodies from the eye is liable to injure this delicate organ.

Calendula; U. S.

CALENDULA.

Calendulæ Herba—Ringelblume, G.; *Fleurs de tout les mois*, F.; *Ringblommor*, Sw.

Origin.—*Calendula officinalis*, Linné (*Compositæ*).

Habitat.—Cultivated everywhere.

Parts used.—The official drug is the "fresh flowering herb." The drug most used heretofore has been the flowers (ray-florets) alone. In fact the official drug is, at this writing, scarcely obtainable in the market.

Description.—The plant has a rough, angular stem; alternate, thick, hairy, spatulate leaves; flower heads five centimeters (2 inches) broad, with conspicuous bright yellow ray-florets. The odor is somewhat narcotic; taste bitter and salty.

Constituents.—A trace of volatile oil, an amorphous bitter principle, yellow coloring matter (tasteless *calendulin*), etc.

Substitutions.—For *marigold flowers* the so-called French or African marigold (Tagetes erecta and Tagetes patula) have been generally sold (Maisch).

Medicinal Uses.—Calendula is reputed to possess tonic and alterative, antispasmodic, diaphoretic, and emmenagogue properties.

A tincture of the flowers has been much used, externally, for similar purposes as the tincture of arnica flowers, and is reported to act very satisfactorily.

CALENDULÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CALENDULA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

CALENDULÆ TINCTURA; U. S.

TINCTURE OF CALENDULA.

Moisten two hundred grams (7 ounces 24 grains) calendula, in No. 20 powder, with four hundred and seventy cubic centimeters (16 fluidounces) diluted alcohol, and macerate twenty-four hours; then pack it firmly in a cylindrical percolator, and gradually pour diluted alcohol upon it, continuing the percolation until one thousand grams (or about 36 fluidounces) tincture has been obtained.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Calumba; U. S.

CALUMBA.

Calumbæ Radix—Columbo Root—Kolumbowurzel, G.; *Columbo*, F.; *Colombo*, Sp.; *Kolumborot*, Sw.

Origin.—*Jateorrhiza Calumba*, Miers (*Menispermaceæ*).

Habitat.—Africa.

Part used.—The root.

Description.—See the Pharmacopœia, page 61. The outer surface is yellowish brown and wrinkled. The slices are about twenty-five to sixty-five millimeters (1 to 2½ inches) in diameter, and six to twelve millimeters (¼ to ½ inch) thick. The flat surfaces are concave, so that the slice is thinner in the centre than at the circumference. The color of the cut surface is greenish yellow or yellowish gray, the yellow color being brightest under the epidermis. The drug is heavy, and easily crushed or powdered.

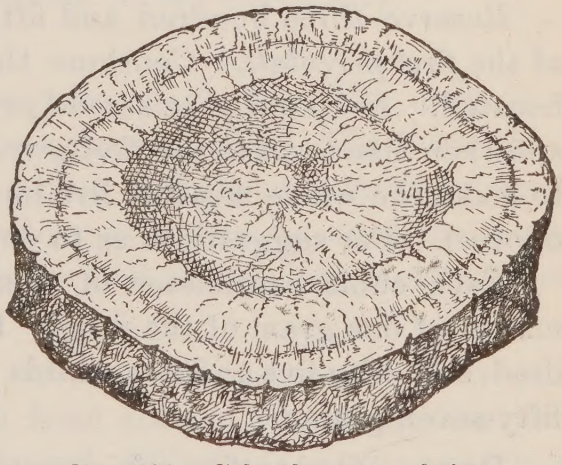


FIG. 131.—Calumba, natural size.

Must have a good color. Worm-eaten columbo root is more common than a sound drug, and should be rejected. The gray cambium ring, crossed by radiating lines, to be observed between the bark and the wood, is a good sign by which to distinguish true calumba from other transversely sliced roots, as bryonia, etc.

Constituents.—*Calumbin*, *calumbic acid*, *berberine*, and *starch*. *Calumbin* forms colorless or white crystals; is odorless, but very bitter. *Calumbic acid* is a yellow, amorphous powder of bitter taste. *Ber-*

berine is a yellow crystalline alkaloid, found in berberis and many other drugs. There is no tannin in calumba.

Medicinal Uses.—Vegetable bitters stimulate the appetite and digestion, and are general tonics. Calumba is one of the best drugs of this class, and is useful, either alone or as an adjuvant to other remedies, in *vomiting of pregnancy, atonic dyspepsia, chronic gastric catarrh, flatulence*, etc. In *convalescence from fevers* it is exceptionally beneficial in restoring appetite and digestion.

Dose.—Ten to thirty grains (0.66 to 2 grams), preferably as fluid extract.

CALUMBÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Calumba.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 20 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and fifty grams (about 5½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted. Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces). For suggestions as to details, see page 451.

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Dose.—One to five cubic centimeters (15 to 75 minims).

CALUMBÆ INFUSUM.

Infusion of Calumba.

From fifteen grams (about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 597.)

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

CALUMBÆ TINCTURA; U. S.

TINCTURE OF CALUMBA.

Mix three hundred grams (12½ fluidounces) alcohol and two hundred cubic centimeters (6¾ fluidounces) water. Moisten one hundred grams (3 ounces 230 grains) calumba, in No. 20 powder, with one hundred and twenty cubic centimeters (4 fluidounces) of the mixed alcohol and water. Macerate twenty-four hours. Pack it in a cylindrical percolator, and percolate with the remainder of the menstruum and as much more, mixed in the same proportions, as may be necessary to obtain one thousand grams (35 ounces 120 grains, or 38 fluidounces) of tincture.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Cambogia; U. S.

GAMBOGE.

Cambogium Gummi-Resina, Gummi-Resina Guttæ, Gutta Gamba, Gambogium, Gambogia—*Gummigutt, Gutti*, G.; *Gutte, Gommegutte*, F.; *Gutagamba*, Sp.; *Gummi-gutta*, Sw.

Origin.—*Garcinia Hanburii*, Hooker filius (*Guttiferæ*).

Habitat.—Siam.

Description.—See the Pharmacopœia, page 63. The drug is a gum-resin. There are two kinds known to the trade. The Siam gamboge in sticks, or *pipe gamboge*, is the best, and the only kind referred to by the Pharmacopœia. *Cake gamboge* is not to be used for pharmacopœial purposes, being very inferior and containing usually from five to twenty per cent. starch.

Constituents.—Contains from seventy-one to seventy-four per cent. resin, called gambogic acid, and from sixteen to twenty-four per cent. gum. Gambogic acid is cherry red, yellow in powder, odorless and tasteless, of acid reaction, insoluble in water, soluble in alcohol and ether. It is not known what the acrid taste of the gamboge is due to. Pure gamboge contains no starch.

Uses.—Gamboge is a powerful hydragogue cathartic, generally given in combination, as in the compound cathartic pills.

The dose is about 0.06 to 0.33 gram (1 to 5 grains). As a hydragogue cathartic to remove *dropsical effusions* it is best given in small doses, 0.06 gram (1 grain) every two hours.

Camphora; U. S.

CAMPHOR.

Kampfer, G.; *Camphre*, F.; *Alcanfor*, Sp.; *Kamfer*, Sw.

Origin.—*Cinnamomum Camphora*, F. Nees et Ebermaier (*Lauraceæ*).

Habitat.—China, Japan, Formosa.

Description.—See the Pharmacopœia, page 63.

The re-sublimed camphor, which is the official kind, consists entirely of the stearopten $C_{10}H_{16}O$. It floats on water, in which it is but very sparingly soluble (1 ounce in 54 pints). It is very readily soluble in alcohol (1 ounce in 1¼ fluidounce), ether, chloroform, bisulphide of carbon, benzin, fixed and volatile oils, strong acetic acid, sulphuric acid, and diluted nitric acid. By heating with a large quantity of sulphuric acid, or with strong nitric acid, the camphor is, however, changed into other compounds. Equal parts of camphor and chloral hydrate triturated together form a homogeneous liquid. When three grams (45 grains) of camphor is rubbed together with one gram (15 grains) crystallized carbolic acid a clear liquid is formed.

The appearance, odor, and taste of camphor are characteristic and familiar. Camphor having any color (yellowish and pinkish camphor is not uncommon) is impure and unfit for the requirements of the Pharmacopœia, and a soft, smeary, or very granular camphor should also be rejected. A good drug is tough, colorless, and crystalline.

Camphor cannot be powdered by trituration, except when moistened with a little alcohol, ether, or chloroform, either of which renders pulverization easy. The powder obtained in this way, however, crystallizes soon again. By grating and sifting, a powder can be obtained which retains its pulverulent condition for a long time.

Balsam of tolu masks the odor of camphor, and the same effect is produced by asafetida, ammoniac, and galbanum.

Medicinal Uses.—Camphor is a stimulant of the brain and the circulation, and causes mental excitement. It is given as a stimulant in the typhoid conditions of many diseases, to check the *muttering delirium* and *subsultus tendinum* in the *exanthemata*, *typhoid*, *typhus*, *variola*, etc. It allays *maniacal excitement* if given in large doses. It is much used, with or without opium, in the first stages of *Asiatic cholera*, in *cholera morbus*, etc. In large doses it is anaphrodisiac, and allays sexual excitement. It is useful in *priapism*, *nymphomania*, *chordee*, etc. It is a popular remedy for external use in *bruises*, *rheumatism*, *headache*, etc. It is often added to liniments.

Dose.—0.06 to 0.33 gram (1 to 5 grains) as a stimulant in *low fevers*, and as an anaphrodisiac up to 0.66 gram (10 grains); in maniacal excitement, about 1.33 gram (20 grains). It is best given suspended in mucilage.

Poisonous Effects.—In large doses camphor may produce toxic effects, gastro-intestinal inflammation, pale and cold skin, weak pulse, stupefaction, convulsions, insensibility, and death.

Coffee and alcohol may be given as antidotes.

CAMPHORÆ ACETUM.

Camphor Vinegar.

Triturate twenty-five grams (386 grains) camphor with five grams (77 grains) glacial acetic acid until reduced to a fine powder; then add, gradually, twenty grams (308 grains) more of glacial acetic acid, continuing the trituration, and finally add enough diluted acetic acid to make the whole one thousand grams (or 34 fluidounces). Set the whole aside during five days, shaking it occasionally. Lastly, filter.

Employed as a prophylactic and antiseptic, as, for instance, to cleanse the hands after dissecting; also as a refreshing and stimulating smelling-vinegar.

CAMPHORÆ AQUA; U. S.

Camphor Water.

Dissolve eight grams (123 grains) camphor in sixteen grams (247 grains, or 5 fluidrachms) alcohol. Distribute this solution on clean cotton, as described under the title Aquæ Aromaticæ. The cotton is then exposed to the air until the alcohol has nearly all evaporated. Then it is packed into the percolator and distilled water is percolated through it until one thousand grams (35 ounces 120 grains, or 34 fluidounces) of percolate has been obtained.

This camphor water is very good.

Used as an adjuvant in diarrhœa mixtures, etc.

Dose.—About fifteen cubic centimeters ($\frac{1}{2}$ fluidounce).

CAMPHORÆ CERATUM; U. S.

Camphor Cerate.

Mix three grams (46 grains) camphor liniment and twelve grams (185 grains) olive oil, and incorporate the mixture with eighty-five grams (3 ounces) simple cerate.

In case camphor liniment is not at hand, use instead its component

parts, 0.6 gram (9 grains) camphor and 2.4 grams (37 grains) cotton-seed oil.

This is a new preparation of the U. S. Pharmacopœia, introduced for the purpose of constructing an easy formula for making cerate of subacetate of lead extemporaneously. (See Plumbi Subacetatis Ceratum.)

CAMPHORÆ CERATUM COMPOSITUM.

Camphor Ice.

Dissolve thirty grams (1 ounce) powdered camphor in 120 grams (4 ounces) oil of almond by the aid of moderate heat. Then melt with this thirty grams (1 ounce) spermaceti, thirty grams (1 ounce) white wax, and sixty grams (2 ounces) paraffin. Strain, and mould it into cakes.

This is a good product. It may be perfumed with a few drops oil of lavender flowers or with any other suitable agent.

Extensively used for *chapped hands*, *lips*, etc.

CAMPHORATA EMULSIO.

Camphorated Emulsion.

Triturate one gram (15 grains) powdered camphor and five grams (75 grains) powdered acacia with three hundred cubic centimeters (10 fluidounces) almond emulsion, gradually added.

An elegant preparation for the internal administration of camphor.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

CAMPHORÆ LINIMENTUM; U. S.

Camphor Liniment.

Dissolve sixty grams (2 ounces) powdered camphor in 240 grams (8 ounces) cotton-seed oil by the aid of moderate heat.

This is the same as the preparation of 1870, except that olive oil was prescribed instead of cotton-seed oil.

An anodyne liniment, used in *sprains*, *bruises*, *rheumatism*, and *painful swellings*.

CAMPHORÆ MIXTURA ACIDA.

Hope's Camphor Mixture.

Mix fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) fuming nitric acid, ten cubic centimeters ($2\frac{1}{2}$ fluidrachms) tincture of opium, and nine hundred and seventy-five cubic centimeters (33 fluidounces) camphor water.

Dose.—Fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) every few hours in *diarrhœas*, etc.

CAMPHORÆ MIXTURA AROMATICA.

PARRISH'S CAMPHOR MIXTURE.

Mix two hundred and fifty cubic centimeters (8½ fluidounces) compound tincture of lavender, thirty grams (1 ounce) sugar, and sufficient camphor water to make the whole measure one thousand cubic centimeters (34 fluidounces).

Dose.—Fifteen cubic centimeters (½ fluidounce) every few hours in *diarrhœas*, etc.

CAMPHORÆ OLEUM.

OIL OF CAMPHOR.

Camphoræ Ætheroleum— Volatile Oil of Camphor.

A yellowish brown volatile oil (elæopten) of the odor and taste of camphor, readily soluble in alcohol. It is obtained from crude camphor, from which it separates in the tanks where the drug is stored before it is packed for exportation from the Chinese ports. It is called in the trade "Camphor Oil of Formosa."

Seldom **used.** Action similar to that of camphor.

Dose.—0.1 to 0.2 cubic centimeter (1 to 3 minims).

CAMPHOR PHENOL.

(See Carbolic Acid Camphor, page 21.)

CAMPHORÆ SPIRITUS; U. S.

SPIRIT OF CAMPHOR.

Dissolve thirty grams (463 grains) camphor in two hundred and ten grams (7 ounces, or 8½ fluidounces) alcohol; add sixty grams (2 fluidounces) water, and then filter.

Used externally as an application to *bruises*, etc.; also as a stimulating application to the nostrils and face in *fainting spells* or *sick headaches.*

CAMPHORÆ SPIRITUS ÆTHEREUS.

CAMPHORATED SPIRIT OF ETHER.

Dissolve thirty grams (463 grains) camphor in one hundred and eighty grams (7½ fluidounces) spirit of ether.

Dose.—About two cubic centimeters (30 minims).

Camphora Monobromata; U. S.

MONOBROMATED CAMPHOR.

Description and Tests.—See the Pharmacopœia, page 64. It represents a molecule of camphor in which one of the atoms of hydrogen has been replaced by an atom of bromine. Should be perfectly white and in well developed crystals.

Monobromate of camphor is useful to allay irritation of the nervous system. It is employed in *epilepsy*, *chorea*, *hysteria*, *insomnia* from excessive mental work or excitement, etc.

Dose.—0.1 to 0.5 gram (2 to 8 grains) in pill, several times a day. Average dose about 0.25 gram (4 grains).

Canella.

CANELLA.

Canellæ Albæ Cortex—*Weisser Zimmt*, *Weisser Kaneel*, G.; *Canelle blanche*, F.; *Hvit kanel*, Sw.

Origin.—*Canella alba*, Murray (*Canellaceæ*).

Habitat.—The West Indies.

Part used.—The bark of the stem.

Description.—Hard white quills, troughs, or irregular fragments, two to four millimeters (about $\frac{1}{8}$ inch) thick. The outer bark is absent. Externally pale brownish red or brownish yellow, and smooth, except that it is marked by long, white, round scars. The thicker pieces of bark from older branches are rough on the outside, but constitute only a small proportion of the drug. The inner surface is white, smooth. Breaks with an even granular white fracture, showing numerous yellowish resin cells in the middle bark and bast fibres. Odor spicy, reminding of cassia; taste bitter, hot, aromatic.

Constituents.—Contains about one per cent. volatile oil and twenty per cent. acrid aromatic resin.

Medicinal Uses.—A stimulant tonic similar in its action to other aromatics. Used to prevent griping of purgatives, as of aloes (in "Hiera Picra"), etc.

Dose.—0.5 to 2.5 grams (8 to 40 grains) in powder or fluid extract.

CANELLÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CANELLA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

Cannabis Americana; U. S.

AMERICAN CANNABIS.

American Hemp, Phar. 1870.

Origin.—*Cannabis sativa*, Linné (*Cannabinaceæ*).

Habitat.—The Southern States of the United States.

Part used.—The flowering plant.

Description.—See the Pharmacopœia, page 64.

Constituents.—Its constituents and properties are probably the same as those of the Indian cannabis, although the American cannabis is so much weaker that it seems to be a superfluous addition to the materia medica list. (See Cannabis Indica.)

CANNABIS AMERICANÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF AMERICAN CANNABIS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.1 to 0.5 cubic centimeter (2 to 6 minims).

Cannabis Indica; U. S.

INDIAN CANNABIS.

Cannabis Indicæ Summitates—Indischer Hanf, G.; *Chanvre Indien*, F.; *Cañamo Indico*, Sp.; *Cannabis Indica*, Sw.; *Guaza, Gunjah, Ganjah, Hasheesh.*

Origin.—*Cannabis sativa*, Linné (*Cannabinaceæ*).

Habitat.—The East Indies.

Part used.—The flowering tops of the female plants, only.

Description.—See the Pharmacopœia, page 64. The Indian cannabis referred to in the Pharmacopœia is the kind known in East India

as *Ganja* and in the London market as *Guaza*. It consists of the flowering tops of the female plant, with a few leaves and a considerable number of fruits, the whole having an appearance of being glued together by resinous matter. The drug has a dark brownish green color, is easily broken, and has a peculiar, somewhat narcotic, but not unpleasant odor. The taste is resinous, very slightly bitterish.

A much crumbled, or discolored, or nearly odorless drug must be rejected.

Varieties of the Drug.—Besides the official variety of the drug there is a dark green substance called *Bhang*, which is smoked with or without tobacco in India, consisting of coarsely broken dried leaves and small stalks, together with a few fruits. This kind of cannabis indica does not reach Europe and America, and is probably much inferior to the ganja.

Although the European, American, and Indian cannabis sativa are one and the same plant botanically, the Indian cannabis differs very greatly from the plant grown in Europe or America as to its medicinal power. It is also stated that in India the plant grown at an elevation of over six thousand feet above the sea exhibits a marked difference from that grown on the plains, the largest amount of resin being produced in the plants in the highest altitudes. Temperature also seems to have a decided influence, an elevated temperature being favorable to an increased formation of resin.

Constituents.—The most important constituent of Indian cannabis is its resin, which is a brown, amorphous substance first separated by T. and H. Smith, of Edinburgh. A powerful narcotic effect was obtained from two-thirds of a grain of this resin, and complete intoxication followed the administration of one grain. The potent effects of the drug are probably chiefly due to this constituent. There is also found in the drug a small quantity of volatile oil, which has a yellow or yellowish brown color, and a strong odor of hemp. This volatile oil also possesses narcotic properties.

Nomenclature.—The *Indian Cannabis* is called on some drug-lists "Foreign Indian Hemp," to distinguish it from the *American Cannabis*, which is sometimes quoted as "Cannabis sativa," and also to distinguish it from *Asclepias incarnata*, the root of which goes by the name of "White Indian Hemp," and from the root of *Apocynum cannabinum*, which is called "Canadian Hemp," but more commonly "Black Indian Hemp." To avoid confusion it is to be hoped that the term "Indian Hemp" be discontinued altogether, and that the names "Indian Cannabis," "American Cannabis," "Asclepias incarnata," and "Apo-

cynum cannabinum" be used to designate respectively the drugs mentioned. See also paragraph under the head of Apocynum cannabinum.

Medicinal Uses.—Cannabis indica is an intoxicant and exhilarant. It has been used for this purpose in various forms in the oriental countries from time immemorial to the present day, and is the haschish of those countries. It is also, like other intoxicants, as alcohol, etc., a narcotic poison in large doses.

Given in full doses, but short of toxic quantities, it produces pleasant intoxication and queer hallucinations in regard to time, space, and sound. Ages seem to be crowded into minutes, and objects and sounds appear to be or come from immense distances though in the same room.

Sometimes a cataleptic condition may occur, during which the limbs remain fixed in whatever condition they are placed by attendants.

After poisonous doses the mind often wanders, the patient experiencing first pleasant, then horrible dreams, and this stage may be followed by collapse, stupor, extreme debility, or convulsions. Anæsthesia also occurs, but death from this drug is rare. These effects may be produced by the internal use of the drug or by smoking it.

As a medicine this remedy is used in *tetanus*, and in some nervous disorders, *insanity* and *delirium tremens*, especially if accompanied by anæmia of the brain.

It is an unreliable remedy, and its administration must be commenced with the smallest doses when a new lot of any of its preparations is employed.

Dose.—0.1 to 0.3 gram (2 to 5 grains), best given as fluid extract.

CANNABIS INDICÆ ABSTRACTUM.

Abstract of Indian Cannabis.

Put three hundred cubic centimeters (10 fluidounces) fluid extract of Indian cannabis into a porcelain evaporating dish; add seventy-five grams (2 ounces 280 grains) powdered sugar of milk; cover the dish with a piece of thin gauze muslin, and set it in a place where the temperature does not exceed 50° C. (122° F.) until the mixture is dry. Add now enough powdered sugar of milk to make the whole weigh one hundred and fifty grams (5 ounces 127 grains), and triturate thoroughly until reduced to a very fine powder. Keep it in tightly closed bottles.

Dose.—0.06 to 0.15 gram (1 to $2\frac{1}{2}$ grains).

CANNABIS INDICÆ EXTRACTUM; U. S.

Extract of Indian Cannabis.

From five hundred grams (or $17\frac{2}{3}$ avoirdupois ounces) of the drug in No. 60 powder.

As a *menstruum* use alcohol. Moisten with one hundred and fifty grams (6¼ fluidounces). Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate until exhausted, or until fifteen hundred grams (about 60 fluidounces) of percolate has been obtained. Recover the alcohol in the usual way, and then evaporate the remainder to solid extract. No glycerin is added to this extract.

Practically the same product is obtained by evaporating the fluid extract to the pilular consistence.

Dark green.

Dose.—0.01 to 0.03 gram (⅙ to ½ grain).

CANNABIS INDICÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Indian Cannabis.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 20 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and fifty grams (about 6¼ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted. Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.10 to 0.3 cubic centimeter (2 to 5 minims).

CANNABIS INDICÆ TINCTURA; U. S.

Tincture of Indian Cannabis.

Moisten one hundred grams (3 ounces 230 grains) Indian cannabis, in No. 40 powder, with one hundred grams (about 4⅛ fluidounces) alcohol, and macerate twenty-four hours. Then pack it firmly in a cylindrical percolator, and percolate with alcohol until five hundred grams (17⅔ avoirdupois ounces, measuring about 20 fluidounces) tincture has been obtained.

The tincture of Indian cannabis of the new Pharmacopœia (1880) is forty per cent. weaker than that of the old Pharmacopœia (1870).

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Cannabis Oleum.

HEMPSEED OIL.

Hempseed yields about twenty-five per cent. of a drying fixed oil by expression. It is greenish, but becomes lighter by age, especially if exposed to the action of light. Specific gravity 0.93. Odor disagreeable; taste bland, unless it is rancid.

Hempseed oil is used in the manufacture of green soft soap, which is so much and so deservedly used as an external application in certain skin diseases.

Cantharis; U. S.

CANTHARIDES.

Spanische Fliegen, *Canthariden*, G.; *Cantharides*, F.; *Cantarida*, Sp.; *Spanska Flugor*, Sw.; *Spanish Flies.*

Origin.—*Cantharis vesicatoria*, De Geer (*Coleoptera*).

Habitat.—Spain, Russia, etc.

Part used.—The whole insect.

Description.—See the Pharmacopœia, page 64.

The largest and best cantharides is the Russian. The odor of cantharides is peculiar and easily recognized. The taste is burning.

Cantharides should not be powdered without properly protecting the nose, mouth, and eyes of the operator. This may be effected by means of a wet cloth or sponge and a pair of coquilles ("goggles").

Preservation.—Cantharides is frequently attacked by mites, which eat the soft parts. To prevent this, the Pharmacopœia directs that the drug "be kept in well-closed vessels containing a little camphor." Camphor is preferable to ether, chloroform, or turpentine for this purpose. The most important precaution as regards the preservation of the drug is, however, to see to it that it is thoroughly dry. If not dry, it is more liable to be attacked by mites, and, moreover, may partially decompose and acquire an exceedingly offensive somewhat ammoniacal odor. The drug should be well dried at about 35° to 40° C. (95° to 104° F.) before being put in its proper receptacle. The best receptacle is, perhaps, a tin can with close-fitting, flat cover.

Constituents.—The active constituent is *cantharidin*. This substance may be a stearopten or a fatty acid. When pure it is in white crystals (?), soluble in boiling alcohol, and more soluble in chloroform, volatile oils, fixed oils, acetic acid, acetic ether, and in ether.

The cantharidin is contained chiefly in the soft parts of the bugs,

where it has been found to the extent of one-fourth per cent. It is a powerfully acrid poison, the one-hundredth part of a grain being sufficient to blister the skin.

Medicinal Uses.—Internally it acts as a stimulant to the circulation and is diuretic. It is occasionally employed in *gleet*, *debility of the bladder* with incontinence of urine in old men, and in *vesical catarrh.*

Externally it is stimulant, rubefacient, and, if allowed to remain in contact with the skin for some time, vesicant.

The latter property renders the drug valuable as a counter-irritant in *chronic effusions into joints*, *general dropsy*, *pericarditis*, *chronic pleurisy*, etc. Blisters are sometimes useful when there is a tendency to coma in typhus or typhoid fever, but it must be borne in mind that the denuded surface in such cases often refuses to heal, but suppurates.

Cantharides is an ingredient of most of the so-called "Hair-restorers."

It is given internally only in the form of tincture.

Dose.—Of the tincture, 0.5 to 1 cubic centimeter (8 to 15 minims).

CANTHARIDIS ACETUM.

Vinegar of Cantharides.

Mix one hundred and eighty cubic centimeters (6 fluidounces) of acetic acid with thirty cubic centimeters (1 fluidounce) of glacial acetic acid, and digest thirty grams (1 ounce) of powdered cantharides in the mixture for two hours at a temperature of 95° C. (203° F.). After cooling transfer the whole to a glass percolator and let the liquid percolate. Continue the percolation with acetic acid until three hundred cubic centimeters (10 fluidounces) of final product has been obtained, which filter.

This preparation is a strong vesicant, producing blisters in two or three hours.

CANTHARIDIS CERATUM; U. S.

Cantharides Cerate.

Blistering Cerate.

Melt together one hundred and twenty grams (4 ounces) yellow wax, one hundred and twenty grams (4 ounces) resin, and one hundred and fifty grams (5 ounces) lard. Strain through muslin. Then incorporate two hundred and ten grams (7 ounces) of powdered cantharides and keep the mixture in a liquid condition by means of a water-bath for half

an hour, stirring occasionally. Then remove it from the water-bath and stir it until cool.

Caution.—By the use of too great heat, vapors containing cantharidin will rise, which are very acrid and affect the eyes and face of the operator, sometimes very seriously. In any event it is best not to stand with the face over the melted cantharidal mixture longer than is absolutely necessary to watch the job. To wear coquilles is a wise precaution. When the cantharides is added the mixture sometimes froths over if the heat is too great.

Cantharidal cerate should be put up in earthenware, glass, or tins. The practice of rolling it into sticks and wrapping these in paper is slovenly and improper. If the cerate is worth anything it is worthy of being properly preserved.

The new cantharides cerate is a substantial improvement upon that of the previous Pharmacopœia, which was too soft. Even the new preparation would be further improved for use in the southern parts of our country by using one-fifth less lard, or equal parts of wax, resin, and lard, which would make the proportions: three hundred and ninety grams (13 ounces) of each of the wax, resin, and lard, with six hundred and thirty grams (21 ounces) cantharides, corresponding to the official strength. The cantharides cerate of 1870 was slightly weaker, the cantharidal strength of that preparation being thirty-three and one-third per cent. ($\frac{1}{3}$), while that of the new is thirty-five per cent.

This is the ordinary form of using cantharides as a blistering agent.

CANTHARIDIS CHARTA; U. S.

Cantharides Paper.

Mix two hundred and forty grams (8 ounces) white wax, ninety grams (3 ounces) spermaceti, one hundred and twenty grams (4 ounces) olive oil, thirty grams (one ounce) Canada turpentine, thirty grams (1 ounce) powdered cantharides (No. 60), and three hundred grams (10 ounces) water in a shallow, flat-bottomed tin pan, and boil the mixture gently for two hours, stirring constantly. Strain through flannel without using any force. Put the strained mixture back into the same pan again, and set it in a water-bath to keep the contents liquid. Now pass strips of sized paper over the surface of the melted plaster, so as to coat them on one side. When dry, cut them into rectangular pieces.

The preparation is identical with that of the Pharmacopœia of 1870. It is best preserved in tin boxes.

It is the most convenient method of using cantharides for producing blisters.

CANTHARIDIS COLLODIUM; U. S.

COLLODION WITH CANTHARIDES.

Cantharidal Collodion.

Pack one hundred and eighty grams (6 ounces) of powdered cantharides (No. 60) tightly in a cylindrical percolator, and exhaust it by percolation with commercial chloroform, or until about seven hundred and fifty grams (25 ounces) of tincture has been obtained. Distil off six hundred grams (20 ounces) of the chloroform. Evaporate the remainder over a water-bath until it weighs forty-five grams ($1\frac{1}{2}$ ounce). Dissolve this in two hundred and fifty-five grams ($8\frac{1}{2}$ ounces) flexible collodion. Let the whole mixture stand and settle, after which pour off the clear and put into small bottles, which must be only two-thirds filled, well corked, and tied over with wetted bladder. Must be kept in a cool place away from any flame.

The cantharidal strength is about the same as that of the preparation of 1870, at least as to the quantity of powdered cantharides used. The cantharidin is, however, much better extracted by the chloroform prescribed in the new Pharmacopœia than by the ether and alcohol used in the old.

This is the most cleanly preparation for obtaining the vesicating effects of cantharides. It is brushed over the part desired to be blistered.

CANTHARIDIS EMPLASTRUM.

CANTHARIDAL PLASTER.

Blistering Plaster.

This is the cerate described on page 272.

CANTHARIDIS EMPLASTRUM COMPOSITUM.

COMPOUND CANTHARIDAL PLASTER.

Emplastrum Calefaciens, B.— *Warming Plaster.*

Infuse one hundred and twenty grams (4 ounces) powdered cantharides in six hundred grams (20 ounces) boiling water for six hours; strain and press it through calico; evaporate until reduced to one-third; then add one hundred and twenty grams (4 ounces) expressed oil of nutmeg, one hundred and twenty grams (4 ounces) yellow wax, one hundred and twenty grams (4 ounces) resin, one thousand five hundred and sixty grams (52 ounces) soap plaster, and nine hundred and sixty grams (32 ounces) resin plaster. Melt and mix all together. Used as a mild counter-irritant in *chronic rheumatism, joint affections*, etc.

EMPLASTRUM PICIS CUM CANTHARIDE; U. S.

PITCH PLASTER WITH CANTHARIDES.

Warming Plaster.

Heat thirty grams (1 ounce) cerate of cantharides at about 100° C. (212° F.) on a water-bath for fifteen minutes, and strain through a muslin strainer close enough to retain the powdered cantharides. To the strained cerate add three hundred and forty-five grams (11½ ounces) of Burgundy pitch; melt the whole together on a water-bath, and then after removing the vessel from the source of heat, stir the plaster constantly until cool. More counter-irritant than simple Burgundy pitch plaster, and less so than cantharidal plaster. Used in *chronic rheumatic swellings*, etc.

CANTHARIDIS EXTRACTI CERATUM; U. S.

CERATE OF EXTRACT OF CANTHARIDES.

Moisten ninety grams (3 ounces) powdered cantharides (No. 60) with fifty-four grams (1.8 ounce, or about 2⅛ fluidounces) of alcohol, and pack tightly in a cylindrical percolator. Then percolate with alcohol until five hundred and forty grams (18 ounces, or about 21 fluidounces) of percolate has been obtained, or until the drug is exhausted. Then distil off about two-thirds of the alcohol, using water-bath heat, and having put the remainder of the liquid into a tared porcelain evaporating dish, evaporate it on a water-bath until reduced to forty-five grams (1½ ounce). Add this to a mixture consisting of forty-five grams (1½ ounce) resin, one hundred and five grams (3½ ounces) yellow wax, and one hundred and five grams (3½ ounces) lard, which have been melted together. Keep the whole mixture melted for fifteen minutes on the water-bath; then strain through muslin and stir until cool.

The strength is thirty per cent.—about the same as in the Pharmacopœia of 1870. Cleaner and nicer than the ordinary cantharidal cerate.

CANTHARIDIS LINIMENTUM; U. S.

CANTHARIDES LINIMENT.

Digest ninety grams (3 ounces) of powdered cantharides (No. 60 powder) with six hundred grams (20 ounces) oil of turpentine in a closed vessel, by water-bath heat, for three hours. Strain, and then add enough oil of turpentine through the strainer to make the liniment weigh six hundred grams (20 ounces).

Same as the preparation of 1870.

CANTHARIDIS LIQUOR EPISPASTICUS.

BLISTERING FLUID.

Liquor Epispasticus, B.

Macerate sixty grams (2 ounces) powdered cantharides in thirty grams (1 ounce) acetic acid for twenty-four hours ; pack in a cylindrical percolator and percolate with ether until one hundred and fifty cubic centimeters (5 fluidounces) has been obtained.

CANTHARIDIS TELA.

ALBESPEYRE'S VESICATORY.

Melt fifty grams (1 ounce 334 grains) linseed oil, one hundred and fifty grams (5 ounces 127 grains) yellow wax, and four hundred and fifty grams (15 ounces 382 grains) black pitch together. Then incorporate three hundred and fifty grams (12 ounces 150 grains) powdered cantharides. While the cerate is still hot spread it on wax-cloth, the reverse of which is marked by intersecting lines forming squares of one centimeter ($\frac{2}{5}$ inch) each.

CANTHARIDIS TINCTURA ; U. S.

TINCTURE OF CANTHARIDES.

Moisten fifteen grams ($\frac{1}{2}$ ounce) powdered cantharides with nine grams (3 fluidrachms) alcohol ; pack it firmly in a cylindrical percolator and percolate with alcohol until three hundred grams (about 12$\frac{1}{2}$ fluidounces) tincture has been obtained.

The new tincture is about forty per cent. stronger than that of the former Pharmacopœia.

This preparation is the one generally employed for the internal administration of cantharides.

Dose.—0.5 to 1 cubic centimeter (8 to 15 minims) in mucilage, or preferably in emulsion of almond or hemp seeds, as oils are said to favor absorption and prevent irritation.

Capsella.

CAPSELLA.

Capsellæ Herba.

Origin.—*Capsella Bursa pastoris*, Moench (*Cruciferæ*).

Habitat.—Europe, America—a common yard weed.

Part used.—The herb.

Description.—Stem slender, usually simple, about thirty centi-

meters (12 inches) or more long, root leaves pinnately cleft, serrate ; the flowers are white, fruit flattened, with a narrow partition in the centre, and numerous brown seeds. Inodorous. Taste pungent, acrid, bitter.

Constituents.—About six per cent. soft resin ; and a volatile oil identical with the volatile oil of mustard. The seeds contain the volatile oil ; they also contain about twenty-nine per cent. fixed oil and twenty-six and one-half per cent. protein compounds.

Medicinal Uses.—It is a stimulant and aromatic, used in *diarrhœa, dysentery, menorrhagia,* etc.

Dose.—Five to ten grams (1 to 2½ drachms) may be given at a dose, in infusion.

Capsicum ; U. S.

CAPSICUM.

Capsici Fructus—Spanischer Pfeffer, Rother Pfeffer, G. ; *Capsique, Piment des Jardins, Corail des Jardins, Poivre d'Inde, Poivre de Guinée, Poivre de Cayenne, Piment rouge,* F.; *Pimiento,* Sp.; *Spansk Peppar,* Sw.; *Cayenne Pepper, African Pepper, Red Pepper, Pod Pepper, Guinea Pepper, Chillies, Bird Pepper.*

Origin.—*Capsicum fastigiatum,* Blume (*Solanaceæ*).

Habitat.—Africa, South America, etc.

Part used.—The fruit.

Description.—See the Pharmacopœia, p. 65. The Pharmacopœia orders the small capsicum pods which are obtained from Capsicum fastigiatum. The pods are one-half to three-fourths inch long and about one-fifth inch in diameter. They are red, and contain about eighteen seeds. The taste is fiery, and the odor pungent and peculiar. It is far stronger than the "Large Pod Pepper."

Constituents.—The extreme acridity of capsicum is probably chiefly due to *capsaicin,* a substance obtained in colorless crystals by Thresh. The thick, yellowish red liquid called *capsicin* (Bucholtz and Braconnot) was probably an ethereal extract containing capsaicin, resin, etc. A volatile alkaloid has also been obtained from capsicum, the odor of which resembles that of coniine.

Large Pod Pepper.—The pods of *Capsicum annuum* constitute the large red pepper, and were official, together with the smaller variety, in the Pharmacopœia of 1870 ; but they are not official in the present Pharmacopœia. These pods are two or three inches long. The ordinary *ground* red pepper, or bird pepper of the market, is probably this variety.

Medicinal Uses.—Capsicum has an exceedingly hot and pungent

taste, producing irritation of the mucous membrane of the mouth, and a flow of saliva. It is frequently used as a condiment, especially in hot climates, causing a sense of warmth in the stomach and increasing the appetite and digestion.

In medicinal doses it is a stimulant, stomachic, and carminative, and as such is employed in various forms of *dyspepsia* (especially in drunkards), and also of *flatulent colic.* It is also often employed, either alone or in combination with opium, in *cholera, cholera morbus, diarrhœa,* etc. It is a valuable ingredient in mixtures given as a substitute for liquor, to check the morbid appetite for alcoholic drinks.

Like all spices, it is injurious in cases of genito-urinary irritation or inflammation. Externally, capsicum is used as a counter-irritant.

Dose.—Five to ten grains (0.33 to 0.66 gram) in powder or pill.

CAPSICI CERATUM COMPOSITUM.

Spice Plaster.

Mix ten grams (154 grains) cloves, ten grams cinnamon, ten grams ginger, five grams (77 grains) capsicum, and five grams camphor, all powdered, and then incorporate with sixty grams (2 ounces 50 grains) simple cerate.

Used as a rubefacient.

CAPSICI EMPLASTRUM; U. S.

Capsicum Plaster.

Coat strips of spread adhesive plaster with a thin coating of oleoresin of capsicum by means of a camel's-hair pencil or other suitable brush, leaving a margin along the edges all around. One grain of oleoresin of capsicum should be put on every square inch of surface. The adhesive margin around the capsicum plaster is obtained cleanest and best by the use of Duckett's plaster square, or some other convenient contrivance for covering all of the adhesive plaster around the part that is to be coated. Strips of stiff brown paper will answer, but not so perfectly.

This preparation is a new one to the U. S. Pharmacopœia.

Counter-irritant and stimulant.

CAPSICI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Capsicum.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with two hundred and fifty grams (about 10½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

This preparation must be handled with great caution, owing to its extreme acridity.

Dose.—0.2 to 0.5 cubic centimeter (3 to 8 minims).

CAPSICI INFUSUM.

Infusion of Capsicum.

From fifteen grams (or about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). See directions on page 597.

A trifle weaker than the preparation of 1870.

Employed as a gargle or topical application in putrid sore throat of scarlatina, etc. It is seldom employed internally.

CAPSICI OLEO-RESINA; U. S.

Oleo-Resin of Capsicum.

Pack five hundred grams (17⅔ avoirdupois ounces) capsicum, in No. 60 powder, into a cylindrical percolator constructed with tight cover and a receptacle adapted to operations with volatile menstrua (see "Oleoresinæ"), and percolate slowly with stronger ether until seven hundred and fifty grams (about 1,000 cubic centimeters, or 34 fluidounces) of percolate have been obtained. Distil off the greater part of the ether and expose the residue for spontaneous evaporation in a porcelain evaporating dish until the remaining ether has disappeared. The product is then allowed to settle, the liquid portion is poured off, and the remainder put on a strainer; when the fatty matter has separated and become thoroughly drained, it is rejected; the liquid portions are then mixed.

The yield is about four per cent. Oleo-resin of capsicum is terribly acrid and fiery, and should be handled with caution.

Used externally in plasters or liniments for local stimulant and rubefacient purposes.

CAPSICI TINCTURA; U. S.

TINCTURE OF CAPSICUM.

The menstruum consists of a mixture of alcohol and water in the proportion of nineteen parts by weight of alcohol (23½ parts by measure) and one part of water. Moisten fifteen grams (231 grains) capsicum, in No. 30 powder, with nine grams (180 minims) of the menstruum; then pack it firmly in a cylindrical percolator and percolate with the same menstruum until three hundred grams (10 ounces 255 grains, measuring about 12 fluidounces) of tincture has been obtained.

This tincture (U. S. Pharmacopœia, 1880) is about forty per cent. stronger than that of the old Pharmacopœia (1870).

The addition of water to the menstruum should not have been made, as pure alcohol is preferable and even necessary. This is sufficiently proven by the fact that fluid extract of capsicum is at once rendered turbid by the least quantity of water.

A useful preparation in cases in which capsicum is indicated.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

Carboneum.

CARBON.

The principal constituent of animal and vegetable matter. Druggists have to deal with it in the following forms:

Carbo Animalis; U. S.

ANIMAL CHARCOAL.

Prepared from bone.

A coarse, granular, black powder. Odorless. Nearly tasteless. See the Pharmacopœia, page 65.

Used only for preparing purified animal charcoal.

CARBO ANIMALIS PURIFICATUS; U. S.

PURIFIED ANIMAL CHARCOAL.

Animal charcoal from which the calcium compounds have been removed by means of dilute hydrochloric acid.

It is used simply to decolorize (and sometimes to deodorize) organic substances in solution.

Carbo Ligni; U. S.

CHARCOAL.

Carbo Vegetabilis.

"Prepared Charcoal" consists of carbon, with generally from one to three per cent. ash.

Charcoal from soft wood, such as willow, poplar, etc., is best, because most porous. Also prepared from oak, beech, birch, etc. When freshly heated it is a powerful deodorizing agent.

Medicinal Uses.—Charcoal absorbs gases and is a deodorizer. It is an ingredient of the charcoal poultice. Taken internally it absorbs some of the gases and fluids in the alimentary tract, and is useful in *heartburn*, *eructations* of gases or sour liquids, *flatulence*, and *dyspepsia*.

Dose.—One to two teaspoonfuls, mixed with water.

CARBONIS CATAPLASMA, B.

CHARCOAL POULTICE.

Is made by macerating one hundred and eighty grams (6 ounces) of bread crumbs for ten minutes with nine hundred grams (30 ounces) of hot water, then adding one hundred and thirty-five grams (4½ ounces) flaxseed meal, stirring constantly until a soft homogeneous mass is formed. With this incorporate twenty-two grams (¾ ounce) powdered charcoal, and sprinkle as much more powdered charcoal over the surface of the poultice.

A deodorizing and cleansing application to *foul ulcers*.

Carbonei Bisulphidum; U. S.

BISULPHIDE OF CARBON.

Disulphide of Carbon.

Description and Tests.—See the Pharmacopœia, page 66.

Colorless, refractive, very diffusive. Odor strong and very offensive. Taste acrid. Does not mix with water. Mixes with alcohol, ether, chloroform, and fixed or volatile oils. Specific gravity 1.272. Inflammable like ether.

Must be kept in tightly corked bottles, in a cool place, away from any flame.

Has powerful solvent properties, dissolving caoutchouc, many resins, fats, etc.

Cardamomum; U. S.

CARDAMOM.

Cardamomi Fructus—*Kardamomen*, G.; *Cardamomes*, F.; *Cardamomo*, Sp.; *Kardemummor*, Sw.

Origin.—*Elettaria Cardamomum*, Maton (*Zingiberaceæ*).

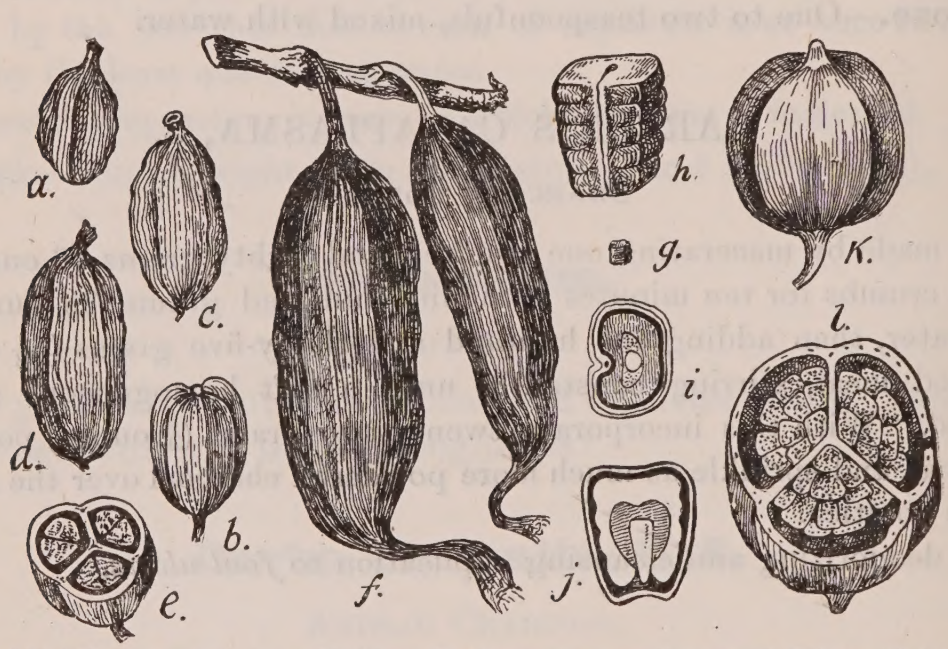
Habitat.—Malabar, etc.

Part used.—The seeds inclosed in their capsules.

Description.—See the Pharmacopœia, page 66.

Varieties.—"Malabar" and "Aleppy" cardamoms are the kinds imported into the United States. Besides these there are Madras cardamoms and Ceylon cardamoms.

All kinds of cardamoms are besides designated according to size and



FIGS. 132-142.—*a* and *b*, short Malabar Cardamom; *c*, medium, and *d*, long Malabar Cardamom; *e*, transverse section, slightly enlarged; *f*, Ceylon Cardamom; *g*, Cardamom seed; *h*, same, enlarged; *i*, transverse, and *j*, longitudinal, sections of seed; *k*, round Cardamom, natural size; and *l*, transverse section of same, slightly enlarged.

shape, by the terms, *shorts*, *short-longs* or *mediums*, and *longs*. "Shorts" are from four-tenths to six-tenths inch long; "short-longs" are from seven-tenths to nine-tenths inch long; and "longs" are from one to two inches.

Malabar cardamoms are the finest. They are either *shorts* or *short-longs*, bleached or unbleached. The choicest are plump, heavy, and have a pale straw or buff color without any green tint, and yield three-fourths or more of their weight of sound and mature seeds. *Shorts* are best.

Madras cardamoms are pale, and not plump, *short-longs*.

Aleppy cardamoms are *shorts*, of a somewhat greenish tint, and are not so good.

Ceylon cardamoms are *longs*, dark grayish brown, and have a different odor and taste from the above three kinds.

These several kinds are figured on opposite page, in their natural sizes respectively.

The shells are tough, inodorous, and tasteless, and have no value. The only reasons why the Pharmacopœia prescribes cardamom to be the whole fruit (the pericarp with the seeds) are, that the seeds, which alone constitute the active part of the drug, are better protected, and their volatile oil retained when they are inclosed in their proper thick capsules, and that the kind and quality of the drug is more readily recognized in this form than in the form of seeds separately.

Several pharmacopœias, among which the British, direct that when the drug is to be used the seeds must be removed from and weighed and used without the capsules, which are to be rejected. This the U. S. Pharmacopœia does not direct, except in the formula for aromatic powder.

Constituents.—The only important constituent of cardamom is the *volatile oil*, which is pale yellow, has the odor and taste of the seeds, in which alone it is contained, and exhibits a neutral reaction. About four and a half per cent. has been obtained.

Medicinal Uses.—Cardamom is used as a spice and as an aromatic carminative and stomachic. It is much used as a flavoring excipient, and also as a corrective to prevent griping in *colic*, *flatulence*, and similar conditions.

Dose.—About one gram (15 grains).

CARDAMOMI EXTRACTUM FLUIDUM COMPOSITUM.

Compound Fluid Extract of Cardamom.

Mix two hundred grams (7 ounces 24 grains) cardamom, two hundred grams cinnamon, one hundred grams (3 ounces 230 grains) caraway, and fifty grams (1 ounce 334 grains) cochineal, and reduce the mixture to No. 60 powder.

Then, using alcohol as a menstruum, make four hundred and forty cubic centimeters (15 fluidounces) of fluid extract by re-percolation, and to this product add sixty cubic centimeters (2 fluidounces) glycerin.

This preparation is much to be preferred to the compound tincture of cardamom. It is three times the strength of the preparations ordinarily sold under the title Compound Fluid Extract of Cardamom.

Dose.—One cubic centimeter (15 minims).

CARDAMOMI INFUSUM.

INFUSION OF CARDAMOM.

Four grams (1 drachm) of bruised cardamom to five hundred cubic centimeters (17 fluidounces) of water. Make an infusion.

Dose.—A wineglassful several times a day.

CARDAMOMI TINCTURA; U. S.

TINCTURE OF CARDAMOM.

Moisten forty-five grams (694 grains) cardamom, in No. 30 powder, with forty-five grams (measuring about $1\frac{2}{3}$ fluidounce) diluted alcohol, and macerate twenty-four hours; then pack it firmly in a cylindrical percolator, and percolate with diluted alcohol until three hundred grams (about 11 fluidounces) of tincture has been obtained.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

CARDAMOMI TINCTURA COMPOSITA; U. S.

COMPOUND TINCTURE OF CARDAMOM.

Mix twenty grams (308 grains) cardamom, twenty grams cinnamon, ten grams (154 grains) caraway, and five grams (77 grains) cochineal, and reduce them to No. 40 powder. Moisten with twenty-five grams (nearly 1 fluidounce) diluted alcohol; pack firmly in a cylindrical percolator and percolate with diluted alcohol until nine hundred and forty grams (about 35 fluidounces) tincture has been obtained. To this add sixty grams (2 ounces) glycerin.

This tincture affords the physician the means of not only imparting a pleasant flavor but also a pleasing appearance to various mixtures, emulsions, etc. The corresponding fluid extract is, however, preferable.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

Carduus Benedictus.

CARDUUS BENEDICTUS.

Cardui Benedicti Folia—Blessed Thistle, E.; *Benedictendistel*, G.; *Chardon bénit*, F.; *Kardbenediktblad*, Sw.

Origin.—*Cnicus Benedictus*, Gærtner (*Compositæ*).

Habitat.—Asia and Europe.

Parts used.—The leaves; sometimes also the flowering tops.

Description.—The leaves are hairy on both sides, especially near

the base ; the veins are well marked ; in the dried state light green ; inodorous ; taste saline, bitter.

Constituents.—A bitter neutral principle called *cnicin*, which crystallizes in colorless prisms, readily soluble in alcohol, less readily so in water. The drug also contains potassium nitrate.

A dose of thirty-six centigrams (6 grains) *cnicin* has occasioned vomiting and diarrhœa.

Medicinal Uses.—It is a bitter tonic, formerly much used in *digestive derangements, atonic dyspepsia, chronic hepatic troubles*, and similar ailments.

Dose.—One to five grams (15 to 75 grains) several times during the day ; best given in extract or fluid extract.

CARDUI BENEDICTI EXTRACTUM.

Extract of Carduus Benedictus.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.5 to 2 grams (10 to 30 grains).

CARDUI BENEDICTI EXTRACTUM FLUIDUM.

Fluid Extract of Carduus Benedictus.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

Carminum.

Carmine.

Carminic Acid.

The red coloring matter of cochineal. As occurring in commerce the best carmine is carminic acid, combined with one or two per cent. of alumina, or, occasionally with oxide of tin or with albumen.

It is entirely soluble in water of ammonia, forming a purplish-red liquid. Any portion remaining undissolved is an impurity.

Used as a coloring agent.

Carnis Extractum.

EXTRACT OF MEAT.

An aqueous extract prepared from lean beef deprived of fat, albumen, and gelatin, as far as practicable.

Dark brown. Has the odor of roasted meet. Yields a clear solution with water, in which it is entirely soluble. Dried at 110° C. (230° F.), it should not lose more than twenty-two per cent. of its weight. Alcohol of ninety per cent. strength (0.822 specific gravity) should dissolve at least fifty-six per cent. of the extract.

The above is Liebig's extract of meat. In its preparation a small quantity of salt and hydrochloric acid are usually employed. The albumen, fat, and gelatin being removed, this extract is not nutritive, but simply stimulant.

Extract of beef is nutritive when made at such a low temperature that the albumen remains in the preparation. It is also nutritive when in its preparation the fibrin is ground up into a smooth paste which is incorporated in the extract.

Medicinal Uses.—Beef extract is often employed as a stimulant. It is not valuable as a nutritive agent, but resembles alcohol in action, although it is much weaker.

CARNIS INFUSUM.

BEEF-TEA.

May be made by placing chopped beef into a wide-mouthed bottle and covering with water. The bottle is then loosely corked and placed in a vessel with water and then over the fire. The water is slowly brought to the boiling point, and the beef is kept simmering for some time, and the liquid finally separated by rubbing through coarse muslin or a fine sieve until only a small portion of exhausted fibrous substance is left on the strainer. Prepared in this way, beef-tea is nutritive as well as stimulant, and may be given to invalids or ill-nourished children. It may be spiced to suit the taste.

Beef-tea, as often made by boiling a piece of beef in water and then pouring off the liquid, resembles urine in chemical composition and is a weak stimulant but not a nutritive.

CARNIS INFUSUM FRIGIDE PARATUM.

COLD-PREPARED BEEF-TEA.

Macerate five hundred grams (17⅔ fluidounces) beef, free from fat and finely chopped, for one hour, with five hundred cubic centimeters

(17 fluidounces) water, to which four grams (60 grains) sodium chloride and one gram (15 grains) diluted hydrochloric acid have been added. Strain through muslin, adding enough water through the cloth to obtain a total colature (without using pressure) of five hundred cubic centimeters (17 fluidounces).

Contains all the albumen of the beef, and is stronger than beef-tea made by heat.

CARNIS VINUM.

WINE OF BEEF.

"Beef and Wine."

Dissolve fifty grams (1 ounce 334 grains) of Liebig's extract of beef in one hundred and fifty cubic centimeters (5 fluidounces) water. Add three grams (45 grains) bruised allspice, and macerate twenty-four hours. Then add six hundred cubic centimeters (20 fluidounces) sherry wine, one hundred and twenty grams (4 fluidounces) simple syrup, and enough water to make the whole product measure one thousand cubic centimeters (34 fluidounces). Filter.

This makes the popular preparation so extensively used under the erroneous impression that it is nutritive. Extract of beef is itself not nutritive, and no preparation of beef such as a wine or elixir, can be made which has nutritive properties. It is simply stimulant.

CARNIS VINUM FERRATUM.

FERRATED WINE OF BEEF.

"Beef, Wine, and Iron."

Dissolve twenty grams (308 grains) soluble phosphate of iron in thirty cubic centimeters (1 fluidounce) hot water, add fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) solution of citrate of sodium, and then enough wine of beef to make the whole measure three thousand cubic centimeters (102 fluidounces).

A popular stimulant tonic.

Carota.

CARROT FRUIT.

Carotæ Fructus.

Origin.—*Daucus Carota*, Linné (*Umbelliferæ*).

Habitat.—Europe.

Description.—Grayish brown, about three millimeters ($\frac{1}{8}$ inch) long; odor and taste aromatic. See the figure.

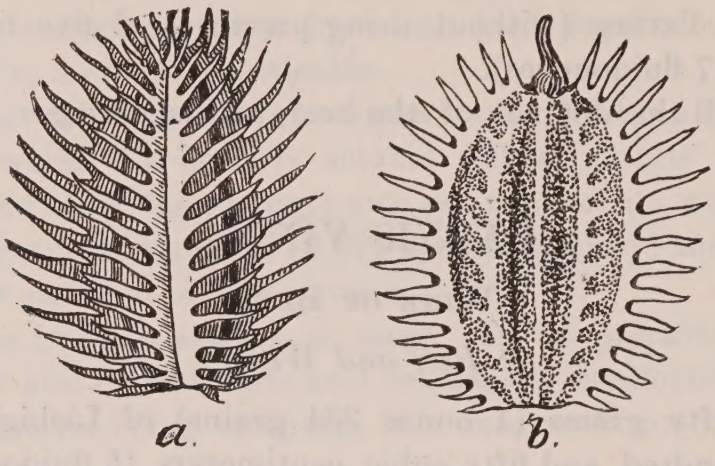


FIG. 143.—Carrot Fruit. *a*, outer, and *b*, inner, surface, enlarged.

Constituents.—Volatile oil.

Medicinal Uses.—Stimulant and diuretic. Used occasionally in *strangury* and *dropsy*.

Dose.—Two to four grams (30 to 60 grains) in powder.

Carthamus.

CARTHAMUS.

Carthami Flores—Safflower, American Saffron.

Origin.—*Carthamus tinctorius*, Linné (*Compositæ*).

Habitat.—Cultivated in India, Asia, Africa, Europe.

Part used.—The flowers.

Description.—Tubular, about two centimeters ($\frac{4}{5}$ inch) long, slender, orange red; odor, feeble, peculiar; taste, bitterish.

Constituents.—Contains a coloring matter called *carthamin*, which dissolves in alcohol with a purple color, turning yellow by heat.

Carthamus is frequently substituted for saffron. So common is this practice that preparations of carthamus have been quoted on price-lists as preparations of "Saffron (Crocus sativus)," at prices which prove that true saffron was not the drug meant.

It is chiefly used as a coloring agent.

Medicinal Uses.—As a diaphoretic in the form of hot infusion.

Dose.—Two to five grams (30 to 75 grains).

Carum ; U. S.

CARAWAY.

Cari Fructus—Kümmel, G. ; *Carvi, Cumin des près*, F. ; *Alcaravea*, Sp. ; *Kummin*, Sw. ; *Caraway Seeds.*

Origin.—*Carum carvi*, Linné (*Umbelliferæ*).

Habitat.—Europe ; cultivated.

Part used.—The fruit, ripe and dried.

Description.—See the Pharmacopœia, page 67. The fruits, according to variety, differ in size, color, and aroma. English caraway is

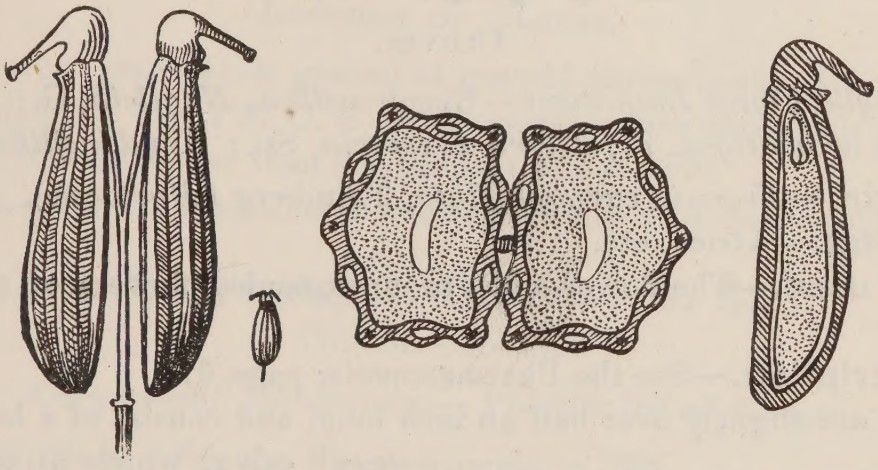


FIG. 144.—Caraway, natural size, enlarged, and longitudinal and transverse sections.

usually preferred, and this is plump and short. The drug must be free from stalks and other admixtures, and from dust.

Constituents.—The value of the drug depends upon its *volatile oil*, of which from three to five, and even as high as seven and nine per cent., has been obtained. (See Oleum Cari.)

Medicinal Uses.—Caraway is in general use as a condiment. It is a stimulant, carminative, and stomachic ; useful in *flatulence*, etc.

Dose.—0.5 to 2 grams (10 to 30 grains).

Cari Oleum ; U. S.

OIL OF CARAWAY.

Description.—See the Pharmacopœia, page 235. Oil of cumin is sometimes sold for oil of caraway. The oil of cumin has a coarser odor. Carminative in doses of 0.05 to 0.5 cubic centimeter (1 to 8 minims).

CARI ELÆOSACCHARUM.

Triturate 0.1 gram (3 drops) oil of caraway with five grams (75 grains) of powdered sugar.

Used as a vehicle or diluent in powders.

CARI SPIRITUS.

SPIRIT OF CARAWAY.

Dissolve thirty grams (1 ounce) oil of caraway in six hundred grams (20 ounces, or 25 fluidounces) of alcohol.

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

Caryophyllus; U. S.

CLOVES.

Caryophylli Flores Immaturæ—*Gewürznelken, Nägelein*, G.; *Girofles, Clous aromatique*, F.; *Clavo de especia*, Sp.; *Kryddnejlikor*, Sw.

Origin.—*Eugenia caryophyllata*, Thunberg (*Myrtaceæ*).

Habitat.—Africa, etc.

Part used.—The flower-buds, or unexpanded flowers of the clove-tree.

Description.—See the Pharmacopœia, page 67.

They are slightly over half an inch long, and consist of a long cylindrical calyx, which at the upper end is divided into four spreading sepals surrounding the four petals which overlap each other forming a globular bud about one-fifth inch in diameter. They have a rich brown color, a strong spicy odor, and a pungent aromatic taste.

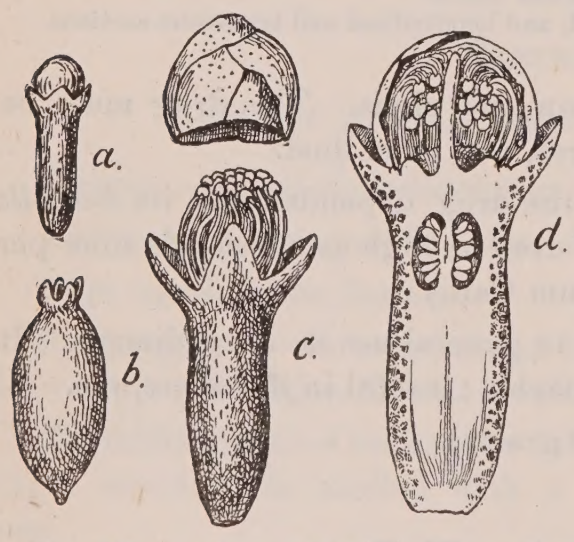


FIG. 145.—*a*, clove, natural size; *b*, mother clove, natural size; *c*, clove, enlarged; *d*, longitudinal section of clove, enlarged.

Cloves to be good must be plump, heavy, of good dark brown color, and rich in volatile oil.

Zanzibar cloves are the only kind imported into the United States.

Constituents.—About fifteen to twenty per cent. *volatile oil* (see Oleum Caryophylli), a tasteless crystalline substance called *eugenin*, a little *salicylic acid*, and a neutral, tasteless, odorless body named *caryophyllin*, which crystallizes in needles. The only constituent of any value is the volatile oil, which is so abundant in cloves that it exudes simply on pressure with the nail.

Cloves should be preserved in well-closed vessels.

Clove-stalks are the flower-stalks of the clove-tree.

Mother cloves consist of the whole fruit, which is about an inch long, and oblong in shape.

Ground cloves as sold by some spice-dealers are adulterated with clove-stalks, mother cloves, allspice, and other substances.

Medicinal Uses.—Cloves are a much prized spice and condiment. They are stimulant, carminative, and stomachic, and are used in *colic*, *flatulence*, etc.

Dose.—One to two grams (15 to 30 grains) in infusion.

CARYOPHYLLI INFUSUM.

INFUSION OF CLOVES.

From ten grams (154 grains) of ground cloves make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 597.) A trifle stronger than the preparation of 1870.

Dose.—Ten to fifteen cubic centimeters (2½ to 4 fluidrachms).

Caryophylli Oleum; U. S.

OIL OF CLOVES.

Caryophylli Ætheroleum—Volatile Oil of Cloves.

Description.—See the Pharmacopœia, p. 235.

Used for flavoring. Also as an addition to paste, pill-masses, etc., to prevent moulding. A pledget of cotton saturated with this oil and pressed into the cavity of the tooth is a popular remedy for *toothache* in dental caries.

CARYOPHYLLI SPIRITUS.

SPIRIT OF CLOVES.

Mix 2.50 cubic centimeters (40 minims) volatile oil of cloves with one thousand cubic centimeters (34 fluidounces) alcohol.

Cascarilla; U. S.

CASCARILLA.

Cascarillæ Cortex—Kaskarillrinde, G.; *Écorce de Cascarille, Écorce Élutherienne*, F.; *Kaskarillbark*, Sw.; *Sweetwood Bark, Eleuthera Bark.*

Origin.—*Croton Eluteria*, Bennett (*Euphorbiaceæ*).

Habitat.—The Bahamas.

Part used.—The bark.

Description.—See the Pharmacopœia, page 67. The drug consists of quills or troughs, from one to three inches long and about one-half inch in diameter, or broken up into smaller fragments. The cascarilla imported into the United States usually consists of young bark, which is of a dull brown color, partly or entirely covered by a silver-white lichenous growth.

FIG. 146.—Cascarilla, natural size.

When burnt, the drug emits a fragrant odor.

Constituents.—About one per cent. of volatile oil, a small quantity of a bitter neutral principle called *cascarillin*, which has been obtained in white crystals, and about fifteen per cent. of resin.

Medicinal Uses.—A stimulant stomachic in atonic conditions of the stomach, or in *dyspepsia* accompanied by *vomiting* and *flatulence*.

It is often added to smoking tobacco to impart a flavor to the latter. If the fumes are inhaled they produce a kind of intoxication.

Dose of the powder, about thirty grains (2 grams) in powder.

CASCARILLÆ EXTRACTUM.

EXTRACT OF CASCARILLA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.50 to 1 gram (8 to 15 grains).

CASCARILLÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CASCARILLA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—One to five cubic centimeters (15 to 75 minims).

CASCARILLÆ INFUSUM.

INFUSION OF CASCARILLA.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 597.)

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms) several times a day.

CASCARILLÆ TINCTURA.

TINCTURE OF CASCARILLA.

Percolate fifteen grams ($\frac{1}{2}$ ounce) powdered cascarilla with diluted alcohol until three hundred cubic centimeters (10 fluidounces) tincture is obtained.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

Cassia Fistula; U. S.

CASSIA FISTULA.

Cassiæ Fistulæ Fructus—Röhrencassie, G.; *Casse Cannefice, Fruit de Canneficer*, F.; *Caña Fistula*, Sp.; *Cassia Fistula*, Sw.; *Purging Cassia.*

Origin.—*Cassia Fistula*, Linné (*Leguminosæ*).

Habitat.—West Indies.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 67. Cylindrical pods of a dark rich brown color, and containing in separate cells from twenty-five to one hundred seeds, and a dark brown, soft, sweet pulp, having an odor like prunes, and containing about sixty per cent. sugar.

Good cassia fistula yields at least thirty per cent. of the pulp, which is the only valuable part of the drug.

It is not known to what the certain though mild laxative effects of the drug are to be ascribed.

FIG. 147.—Cassia Fistula, piece, natural size.

Medicinal Uses.—Cassia fistula is a mild laxative, but is seldom employed except in combination with other remedies, as confection of senna.

Dose.—As a laxative, four to eight grams (1 to 2 drachms) of the pulp; as a purgative, thirty to sixty grams (1 to 2 ounces).

Castanea; U. S.

CASTANEA.

Castaneæ Folia—Chestnut Leaves.

Origin.—*Castanea vesca*, Linné (*Cupuliferæ*).

Habitat.—Europe and America.

Part used.—The green leaves collected in September or October.

Description.—See the Pharmacopœia, page 68. They should have a good green color and an astringent taste.

Constituents.—Tannin is one of the active constituents. It probably contains also other active substances, but it has not yet been sufficiently accurately analyzed.

FIG. 148.—Chestnut Leaf, reduced.

Medicinal Uses.—This drug has been used with success in *whooping-cough*, in which disease it affords marked relief. The best form for administration is the fluid extract.

Dose of the fluid extract, two to five cubic centimeters (30 to 75 minims) every three to four hours.

CASTANEÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF CASTANEA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), pour two thousand five hundred cubic centimeters (about 5½ wine pints) of boiling water on five hundred grams (17⅔ avoirdupois ounces) of castanea, in No. 30 powder, and macerate for two hours. Express the strong infusion. Transfer the wet drug to a percolator, pack it moderately firmly, and percolate with water until exhausted. Mix the percolate with the reserved infusion and evaporate on water-bath to one thousand cubic centimeters (34 fluidounces). When cool, add three hundred cubic centimeters (about 12½ fluidounces) of alcohol, shake well, and set aside. When the sediment has quite subsided draw off the clear liquid, evaporate it to four hundred

cubic centimeters (about 13½ fluidounces) and, when cold, add to it one hundred cubic centimeters (3½ fluidounces) of alcohol.

Each cubic centimeter represents one gram of the drug, and each fluidrachm nearly fifty-seven grains.

New to the Pharmacopœia.

Dose.—Two to five cubic centimeters (36 to 75 minims).

Castoreum.

CASTOREUM.

Bibergeil, G.; *Castoréum*, F.; *Castoreo*, Sp.; *Bäfvergäll*, Sw.; *Castor.*

Origin.—*Castor fiber*, Linné (*Mammalia*).

Habitat.—Northern parts of Asia, Europe, and America.

Part used.—A concrete substance, formed from secretions from the preputial follicles of the beaver.

Description.—Both the male and the female animals yield castor. The drug consists of the two pear-shaped sacs between the rectum and genitals. The sacs are several inches long, and adhere to each other at the narrow end. After being cut out from the killed beaver the castor sacs are dried, usually by being smoked. Occur in commerce in pairs. They are dark brown, almost black, tough, and when broken have a resinous fatty appearance. The odor is strong and peculiar, and the taste bitter and pungent. The mass is scarcely at all soluble in water, but alcohol dissolves more than one-half of its weight.

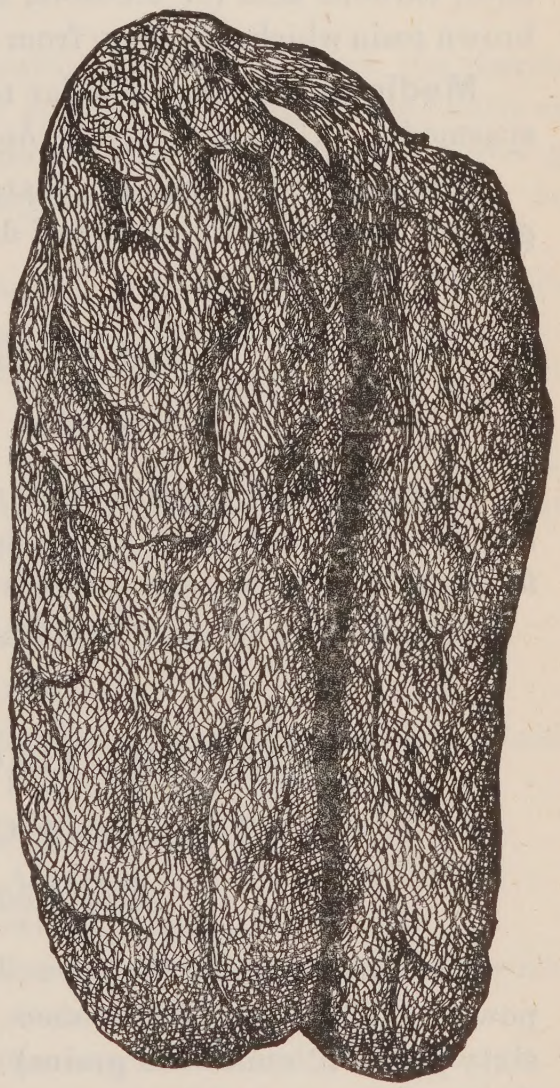


FIG. 149.—Castoreum, natural size.

There are two principal varieties: American or Canadian castor, and Siberian or Russian castor. If, as seems probable, the properties of the drug depend upon the volatile oil and the resin, then the Russian castor is much the better of the two, the Russian castor containing two per cent. volatile oil, and about fifty-

eight per cent. resin, while the American contains only one per cent. of the volatile oil and less than twenty-five per cent. resin. Russian castor sacs are about twice the weight of the American, the former weighing from sixty to two hundred and forty grams (2 to 8 ounces) while the latter weigh from thirty to one hundred and twenty grams (1 to 4 ounces).

Russian castor is never glossy, but earthy looking, yellowish brown, or darker, and has a much stronger odor and taste than the American variety, which is often glossy, brownish red, or blackish.

Russian castor is rarely sold in the United States. It fetches many times the price of the American.

Constituents.—Contains a pale yellow volatile oil of a very strong odor, carbolic acid (or creosote, formed by the smoking of the sacs?) a brown resin which makes up from one-sixth to over one-half of the castor.

Medicinal Uses.—Similar to those of musk. Stimulant and antispasmodic. Used in *hysteria, hysterical convulsions*, etc.

Dose.—Very variable. Stated to be from 0.5 to 5 grams (8 to 75 grains), according to quality of drug.

CASTOREI TINCTURA.

Tincture of Castoreum.

Macerate thirty grams (1 ounce) coarsely powdered castoreum for five days with a mixture of two hundred and forty cubic centimeters (8 fluidounces) alcohol, and ninety cubic centimeters (3 fluidounces) water.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

CASTOREI TINCTURA THEBAICA.

Tincture of Castor with Opium.

Äkta Moderdroppar, Sw.

Macerate together for five days ten grams (154 grains) opium in powder, thirty grams (1 ounce 25 grains) empyreumatic hartshorn, sixty grams (2 ounces 50 grains) coarsely powdered asafœtida, one hundred and twenty grams (4 ounces 100 grains) coarsely powdered castor, seven hundred and fifty cubic centimeters (25 fluidounces) alcohol, and three hundred cubic centimeters (10 fluidounces) water. Express and filter.

Dose.—One to two cubic centimeters (15 to 30 minims).

Cataplasmata.

POULTICES.

Consist of some emollient substance mixed with warm water, and are used for external application.

They are usually made with linseed meal and water as a base, though they may be made from bread-crumbs, powdered slippery-elm bark, or cornmeal with hot water or milk.

The poultice may be made anodyne by adding tincture of opium, or fluid extract of belladonna, conium, or hyoscyamus, or the leaves of these drugs; cooling, by adding solution of subacetate of lead; stimulant, by the addition of yeast or turpentine, or by using powdered mustard; deodorizing, with charcoal; disinfectant and antiseptic, with carbolic acid, etc.

The warmth and moisture of a poultice soften and relax the tissues and allay *pain* and *inflammation*. If applied for a longer time poultices promote suppuration, and are therefore useful as applications to forming *abscesses*, *carbuncles*, *glandular enlargements*, etc., while they must be used cautiously about the joints.

In *peritonitis*, *pneumonia*, or *pleurisy*, a large and warm poultice often affords marked relief. In some cases dry applications of pillows with warm bran or cornmeal, with chamomile or hops, give even more relief than the moist poultices.

Poultices should not be applied directly to the skin, as is so often done, but should be folded between two thicknesses of thin muslin, so as to leave the skin clean when they are removed.

Cataria.

CATARIA.

Catariæ Herba—Katzenmünze, *Katzenkraut*, G.; *Cataire*, *Herbe aux chats*, *Menthe de chats*, F.; *Catnep*, *Catmint*.

Origin.—*Nepeta Cataria*, Linné (*Labiatæ*).

Habitat.—Asia, Europe, North America.

Parts used.—The leaves and flowering tops.

Description.—Stem and leaves hairy, grayish green; flowers whitish; odor peculiar, mint-like; taste aromatic, bitter.

Constituents.—Volatile oil, bitter extractive, and a little tannin.

Medicinal Uses.—Stimulant and tonic. Used as a stomachic in indigestion, but most frequently as a remedy for the *flatulent colic* of infants.

Dose.—Two to five grams (30 to 75 grains) in infusion or fluid extract several times daily.

CATARIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CATARIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

CATARIÆ INFUSUM.

INFUSION OF CATARIA.

From fifty grams (about 1¾ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 597.)

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Catechu; U. S.

CATECHU.

Catechu Extractum Crudum—Katechu, Pegu-Catechu, G.; *Cachou Noir,* F.; *Catecu, Cato, Tierra Japonica,* Sp.; *Kateku,* Sw.—*Black Catechu, Cutch, Terra Japonica.*

Origin.—*Acacia Catechu,* Willdenow (*Leguminosæ*).

Habitat.—From Pegu.

Description.—See the Pharmacopœia, page 68. It comes in large masses, which are hard and brittle, internally porous and glossy; odor, slight; taste, strongly astringent and sweetish. Only a portion of it is dissolved out by water, leaving the *catechin* undissolved. The drug is almost entirely dissolved by alcohol.

Constituents.—The constituents of cutch, or black catechu, are *catechu-tannic acid* and *catechin.*

The astringency is due to *catechu-tannic acid.* It exists, already formed, in the catechu to the extent of fifty per cent., and may be dissolved out with cold water. It is also soluble in alcohol and in a mixture of alcohol and ether, but insoluble in ether. With ferric salts (solution of chloride of iron, or of tersulphate of iron) it forms greenish-brown precipitates. Catechu-tannic acid is formed from catechin, the latter being converted by continued boiling into catechu-tannic acid.

Catechin (also called catechuic acid) is insoluble in cold water, but soluble in alcohol and ether, and somewhat soluble in boiling water. It

has been obtained in white, needle-like crystals. As already stated, it is converted into catechu-tannic acid by heat.

Squire states that cold water dissolves eighty-eight per cent. of this variety of catechu, *forming a very turbid solution*, and that six ounces of gelatine precipitates all of the astringent matter from the watery solution obtained from ten ounces of the drug.

See also Areca.

Medicinal Uses.—Catechu is a powerful vegetable astringent. It is used to check *diarrhœa;* also as a gargle and mouth-wash in a relaxed condition of the uvula or pharyngeal mucous membrane, and in *spongy gums;* as an injection in *leucorrhœa*, etc.

Dose.—One to thirty grains (0.06 to 2 grams).

CATECHU EXTRACTUM LIQUIDUM.

Liquid Extract of Catechu.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use two hundred and fifty grams (or its equivalent—$8\frac{5}{6}$ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use diluted alcohol. Mix the drug with an equal bulk of clean sand of about the same fineness. Moisten the drug with one hundred grams (about $3\frac{3}{4}$ fluidounces) of the *menstruum*. Pack it in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces). (For suggestions as to details, see page 451.)

Each cubic centimeter of the liquid extract represents the soluble matter of one-half gram of the drug. Each fluidounce represents two hundred and twenty-seven and five-sixths grains; and each fluidrachm nearly twenty-eight and a half grains.

"Fluid Extract of Catechu" of the same relative strength as other fluid extracts cannot be made. (See Liquid Extract of Aloes.)

Dose.—0.6 to 2 cubic centimeters (10 to 30 minims).

CATECHU TINCTURA COMPOSITA; U. S.

Compound Tincture of Catechu.

Mix thirty-six grams (555 grains) catechu and twenty-four grams (370 grains) cinnamon, both in powder of No. 40 fineness. Moisten

the mixture with forty-five grams (about $1\frac{3}{4}$ fluidounce) diluted alcohol. Macerate twenty-four hours. Then pack it in a cylindrical percolator and percolate with diluted alcohol until three hundred grams (about 10 fluidounces) tincture is obtained.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

CATECHU TROCHISCI; U. S.

CATECHU TROCHES.

Mix 6.50 grams (100 grains) catechu, sixty-five grams (1,000 grains) sugar, and 1.60 gram (25 grains) tragacanth, all in fine powder. Then form the mass with a sufficient quantity of orange-flower water, and divide it into one hundred troches.

Catechu Pallidum.

PALE CATECHU.

Uncariæ Extractum Crudum—Gambir.

Origin.—*Uncaria Gambir*, Roxburgh (*Rubiaceæ*).

Habitat.—East Indian Islands.

Description.—A dry extract obtained by evaporating a decoction prepared by boiling the leaves and young shoots in water. Usually in square masses, brown externally, pale grayish brown internally; often somewhat soft and sticky; usually dry and showing crystalline particles under the microscope; partially soluble in water; inodorous, astringent, somewhat sweetish.

Constituents.—*Catechin* and some catechu-tannic acid, formed from the catechin in the process of inspissating the decoction. It is inferior to the black catechu, as the medicinal value of the drug depends upon the catechu-tannic acid, of which the gambir contains much less than true catechu.

Caulophyllum; U. S.

CAULOPHYLLUM.

Caulophylli Radix—Blue Cohosh, Pappoose Root, Squaw Root, Blueberry Root.

Origin.—*Caulophyllum thalictroides*, Michaux (*Berberidaceæ*).

Habitat.—Canada and the northern portions of the United States.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 68.

Must be sound and free from dirt. An admixture of golden seal,

which is not uncommon, will be at once detected by the yellow color shown by the latter on breaking it.

Constituents.—*Saponin* and two *resins.*

Caulophyllin is a preparation containing the resins, prepared by precipitation from a concentrated alcoholic tincture (half strength of the fluid extract) by pouring this into eight times its volume of water.

Medicinal Uses.—Blue cohosh is said to be demulcent, diaphoretic, diuretic, anti-spasmodic, emmenagogue, and parturient. It is given to facilitate *parturition* in those cases of delay which are due to debility or fatigue. It is also said to be useful in *rheumatism, dropsy, colic, hysteria,* etc.

Dose.—1 to 2.5 grams (15 to 40 grains).

CAULOPHYLLI EXTRACTUM.

EXTRACT OF CAULOPHYLLUM.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Dose.—0.05 to 0.3 gram (1 to 5 grains) three times a day.

Brown.

CAULOPHYLLI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CAULOPHYLLUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—1 to 2.5 cubic centimeters (15 to 40 minims).

Cera Alba; U. S.

WHITE WAX.

Weisses Wachs, G.; *Cire blanche,* F.; *Cera blanca,* Sp.; *Hvitt vax,* Sw.

Origin, Description, Tests, and Uses.—See CERA FLAVA. See also Pharmacopœia, page 68.

White wax is obtained by bleaching yellow wax by exposure to moisture, light, and air.

It always has a slightly yellowish hue. The odor is peculiar but not

unpleasant. Comes usually in round cakes, about one decimeter (4 inches) in diameter, or in rectangular ones about seven and one-half by ten centimeters (3 by 4 inches). Must not be unctuous to the touch.

White wax turns rancid much more rapidly than the yellow, and ought not to be used in ointments, cerates, etc., where yellow wax can be made use of.

CERATA CHARTA.

Wax Paper.

This is best prepared by rubbing sheets of thin, fine (French) letter-paper with melted wax by means of cotton-waste or a ball of loose cotton or woollen yarn. The paper must be laid on a clean piece of boiler plate, or on a sheet of copper, kept hot on the stove, and only a small quantity of the melted wax is needed to impregnate the paper, the cotton-waste being dipped lightly into the wax and rubbed into the paper with considerable force. Only one sheet can be finished at a time, and not more than two sheets of paper ought to be laid on the plate, the under sheet being intended simply to prevent the other from being soiled. Paraffine may be used in place of wax.

Wax paper, or paraffine paper, is very useful in a drug store. Plasters in rolls and cerates are wrapped, and even ointments may be neatly put up in it, unless very soft. It is also used to cover spread plasters, and "tie-over jars," and finally, for putting up powders containing volatile or hygrometric substances.

COLD CREAM

is made by melting together thirty grams (1 ounce) white wax, thirty grams (1 ounce) spermaceti, and one hundred and eighty grams (6 ounces) oil of almonds, then adding two hundred and seventy grams (9 fluidounces) rose-water, and enough oil of rose to perfume it. The rose-water and oil of rose are added when the melted mixture is still liquid, and the whole then stirred briskly until cold.

Used as an application to *chapped hands*, etc., and as a cosmetic preparation to render the skin soft and smooth.

Cera Flava; U. S.

Yellow Wax.

Gelbes Wachs, G.; *Cire jaune*, F.; *Cera*, Sp.; *Gult vax*, Sw.

Origin.—*Apis mellifica*, Linné (*Hymenoptera*).

Description.—See the Pharmacopœia, page 69. In large yellow, or pale brownish yellow cakes. Odor pleasant, reminding of honey.

Wax, both yellow and white, is very frequently adulterated with paraffine, ceresin, etc. These adulterations are detected by the tests given in the Pharmacopœia. Wax adulterated with paraffine has not a level upper surface after cooling, as pure wax has, but a concave one.

Constituents.—*Cerin* or *cerotic acid*, about seventy-three per cent., insoluble in alcohol; *myricin* or *melissyl palmitate*, about twenty-two per cent., soluble in alcohol; and about five per cent. of a fat called *cerolein*, which gives the odor and color to the yellow wax.

Medicinal Uses.—Both white and yellow wax are used as ingredients of cerates, ointments, and plasters. Used with olive oil or lard they form simple protective ointments. White wax is apt occasionally to produce irritation, being more liable to become rancid, and yellow wax is, therefore, preferable for all uses to which wax is put, the objection being mainly that the preparations do not present as beautifully white an appearance.

CERÆ EMULSIO.

EMULSION OF WAX.

Triturate 6.50 grams (100 grains) yellow wax in a warmed Wedgewood mortar with 6.50 grams (100 grains) yolk of egg, 13 gram (200 grains) sugar, and enough boiling water, gradually added, to make an emulsion measuring three hundred cubic centimeters (10 fluidounces). Demulcent.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

Cerata.

CERATES.

These preparations are mixtures of fatty substances, mostly containing wax, having at ordinary temperatures a much firmer consistence than ointments, but not as firm as plasters, and melting only at temperatures above 40° C. (104° F.). They are intended for external application, dressings on lint, etc.

Ceratum; U. S.

CERATE.

Ceratum Adipis, Ceratum Simplex—*Cerat*, G., F., and Sw.; *Cerato*, Sp.; *Simple Cerate, Lard Cerate.*

In the new Pharmacopœia the simple cerate is made by melting together ninety grams (3 ounces) white wax and two hundred and ten grams (7 ounces) lard, stirring until cool.

The proportions in the Pharmacopœia of 1870 were three ounces wax to six ounces lard, which was somewhat too firm, at least for the climate in the northern part of the United States. We think yellow wax should be used instead of white. (See Cera Alba.)

Medicinal Uses.—Simply a bland and soothing protective application to raw surfaces. Also used as a vehicle for more active remedies for external application.

Ceresinum.

CERESIN.

Earth Wax, Mineral Wax.

This is the Gallician mineral *ozokerite*, which resembles wax and is used as an adulterant of wax. It is scarcely at all acted upon by strong sulphuric acid, and can in that way be distinguished from wax which is completely destroyed by that acid. Naturally it is almost black, but by purification it is rendered yellow or even white.

Cerium.

CERIUM.

A comparatively rare metal, occurring in the mineral *cerite*, associated with lanthanum and didymium. The oxalate of cerium is much used in medicine, and lately to some extent also the nitrate.

Cerii Nitras.

NITRATE OF CERIUM.

Cerosus Nitras—Cerous Nitrate.

A colorless or slightly pinkish-colored salt, crystalline, freely soluble in water and in alcohol.

Used like oxalate of cerium, and in similar doses.

Cerii Oxalas; U. S.

OXALATE OF CERIUM.

Cerosus Oxalas—Cerous Oxalate.

A heavy, white, somewhat granular, odorless, tasteless powder, insoluble in water or in alcohol.

See the Pharmacopœia, page 72.

Medicinal Uses.—Oxalate of cerium is used in *vomiting* of reflex

origin, when there is no lesion of the stomach itself. It is especially useful in the *morning sickness*, or *vomiting of pregnancy*.

Dose.—0.06 to 0.5 gram (1 to 8 grains) in powder, three times a day, commencing with the smaller doses and increasing if necessary.

Cetaceum ; U. S.

SPERMACETI.

Walrath, G.; *Blanc de baleine, Cétine, Ambre blanc*, F.; *Esperma de Ballena*, Sp.; *Walrat*, Sw.

Origin.—A solid, crystalline fat, obtained from the head of the sperm-whale, *Physeter macrocephalus*, Linné (*Cetacea*).

Description.—See the Pharmacopœia, page 72. Unlike other fats it does not yield glycerin when saponified, but *ethal*. The drug is almost pure *cetin*, or palmitate of cetyl. It melts at 50° C. (122° F.), and is soluble in ether, chloroform, bisulphide of carbon, and in boiling alcohol.

Must be perfectly snow-white, translucent, crystalline, odorless, and free from rancidity. It is not acted upon by a boiling dilute solution of soda, and leaves no grease spot on paper.

Preservation.—Should be kept in a cool place, and best in a tin can with tight cover.

Uses.—Employed almost exclusively for external application as an ingredient of ointments. It is occasionally used in emulsion with yolk of eggs or acacia as a lenitive and demulcent in *irritation of the bowels*. (See "Ceræ Emulsio.")

Spermaceti is often used in the laundry, boiled with starch, for imparting a glossier and smoother finish to fine linen, etc.

CETACEI CERATUM ; U. S.

SPERMACETI CERATE.

Melt together thirty grams (1 ounce) spermaceti and one hundred and five grams (3½ ounces) white wax ; then add one hundred and sixty-five grams (5½ ounces) olive oil, and stir the mixture until cool.

Very nearly the same as that of the Pharmacopœia of 1870.

Used as a simple and unirritating protective application in *burns, scalds*, or *excoriations*. Used also as a vehicle for more active remedies for external application.

CETACEUM SACCHARATUM; G.

SACCHARATED SPERMACETI.

Is made by triturating thirty grams (1 ounce) spermaceti with ninety grams (3 ounces) sugar until intimately mixed and reduced to a very fine powder.

Demulcent and lenitive.

Dose.—Five to ten grams (1 to 2½ drachms).

Cetraria; U. S.

CETRARIA.

Isländisches Moos, Lungenmoos, G.; *Lichen d'Islande,* F.; *Liquen, Liquen Islandico,* Sp.; *Islandsmossa, Islandslaf,* Sw.; *Iceland Moss.*

Origin.—*Cetraria islandica,* Acharius (*Lichenes*).

Habitat.—Northern hemisphere.

Part used.—The entire dried lichen.

Description.—See the Pharmacopœia, page 72.

It is stiff and brittle, but becomes soft and assumes its natural shape when immersed in water. It is brownish and spotted, paler on the under side. Odorless. Taste bitter, mucilaginous. Boiled with thirty parts water it forms a jelly.

Constituents.—The principal constituent is *lichenin,* or *lichen starch,* of which it contains about seventy per cent. This forms the jelly when cetraria is boiled with water. The bitter taste of the drug is from *cetrarin* or *cetraric acid,* about two to three per cent. This can be removed by washing with weak alkali. (See Cetraria Lota.) When pure it forms fine colorless needles, soluble in alcohol, but nearly insoluble in water.

Medicinal Uses.—Cetraria is a demulcent and bitter tonic. It enjoys popular confidence as a remedy in pulmonary diseases, but its effects probably depend entirely on its indirect action in being nutrient, and at the same time stimulating appetite for other food and furthering digestion.

These properties also indicate its use in chronic dysentery and diarrhœa, especially as it also has a local demulcent or lenitive effect.

Dose.—*Ad libitum.*

CETRARIA LOTA.

WASHED ICELAND MOSS.

Iceland moss makes a very dark, dirty-looking decoction or jelly, unless previously washed. To wash it use a solution made of thirty grams (1 ounce) pearlash in five liters (11 pints) of water, pouring enough of this on the drug to cover it well. After letting it stand twelve hours, pour off the liquid, and then wash the lichen with cold water until the washings are perfectly tasteless, after which dry it.

Used for the same purposes as cetraria.

CETRARIÆ DECOCTUM; U. S.

DECOCTION OF CETRARIA.

Iceland Moss Decoction.

Thirty grams (1 ounce) cetraria is covered with two hundred and forty grams (8 ounces) cold water. After half an hour the liquid is pressed out and thrown away. Six hundred grams (20 ounces) of water are now poured on the drug and boiled with it for half an hour. The decoction is strained, and enough water added through the strainer to make the whole product weigh six hundred grams (20 ounces—it will measure about nineteen fluidounces).

This is the best form for giving cetraria.

Dose.—Three to four fluidounces several times daily.

Chartæ Medicatæ.

MEDICATED PAPERS.

Preparations consisting of (unsized) paper impregnated with some medicament, for external use, or for fumigation or inhalation. (Wax paper is made of either sized or unsized paper. See page 302.)

Chelidonium; U. S.

CHELIDONIUM.

Chelidonii Herba—Schöllkraut, G.; *Chélidoine, Herbe à l'hirondelle*, F.; *Celidonia, Celidonia Mayor*, Sp.; *Chelidonium*, Sw.; *Celandine, Tetterwort.*

Origin.—*Chelidonium majus*, Linné (*Papaveraceæ*).

Habitat.—Europe and North America.

Part used.—The whole herb.

Description.—See the Pharmacopœia, page 74.

Constituents.—The drug contains, combined with chelidonic acid (or succinic acid ?) two alkaloids. One is named *chelidonine*, in colorless crystals, insoluble in ether. It has a bitter, acrid taste, and forms colorless salts with the alkalies. The other alkaloid is *chelerythrine* (or *pyrrhopine*), which is identical with sanguinarine, the alkaloid found in sanguinaria (blood-root). (See Sanguinaria, p. 881.) Besides these two alkaloids there is in this drug a yellow crystalline substance, of a bitter taste, called by Probst *chelidoxanthin*, which is freely soluble in hot water, sparingly soluble in alcohol, insoluble in ether, and not affected by acids or by alkalies.

Medicinal Uses.—This drug had been obsolete for some time, but of late years has again come into use. It was praised by Rademacher as a valuable remedy in *jaundice* and all *hepatic troubles*, etc.

It is probably simply a drastic purgative, and less reliable than many other remedies for the same purpose.

Externally the fresh juice or freshly bruised herb is irritating.

Dose.—Of the fresh juice, 2 to 2.5 cubic centimeters (30 to 40 drops) ; of the extract, about 0.5 gram (8 grains).

The fluid extract is the only preparation used in this country.

CHELIDONII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CHELIDONIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—One to five cubic centimeters (15 to 75 minims).

Chelone.

CHELONE.

Balmony, Snakehead, Turtlehead, Shellflower.

Origin.—*Chelone glabra*, Linné (*Scrophulariaceæ*).

Habitat.—North America.

Part used.—The herb.

Description.—About sixty to one hundred centimeters (2 to 3 feet) high, with large white or purple flowers. The corolla is supposed to resemble in its shape the head of a reptile, whence the names. Extremely bitter.

Constituents.—The intense bitterness of the drug does not belong to a tonic principle, for it is purgative. It has not been analyzed.

Uses.—Laxative or purgative. Best given in the form of fluid extract. It is also sometimes used as an anthelmintic.

CHELONES DECOCTUM.

Made from thirty grams (1 ounce) to three hundred cubic centimeters (10 fluidounces).

Dose.—Fifty cubic centimeters ($1\frac{2}{3}$ fluidounce).

CHELONES EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CHELONE.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

Chenopodium; U. S.

CHENOPODIUM.

Chenopodii Fructus—Amerikanischer Wurmsamen, G.; *Semences de chénopode anthelmintique*, F.; *American Wormseed.*

Origin.—*Chenopodium ambrosioides*, Linné (*Chenopodiaceæ*).

Habitat.—North America, Europe.

Part used.—The fruits.

Description.—See the Pharmacopœia, page 74. Very small fruits, commonly called seeds. They are of a dull greenish yellow color. When old they are brown. Offensively aromatic.

Constituents.—A considerable quantity of volatile oil, which is probably the only active constituent.

Medicinal Uses.—Wormseed is given as an anthelmintic or vermifuge for lumbricoid or round worms, in the form of electuary, made of the powdered fruit with honey or syrup, or preferably in the form of fluid extract.

The remedy should be given two or three times a day for several days, and should then be followed by a purgative.

Dose.—One to two grams (15 to 30 grains).

CHENOPODII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CHENOPODIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

Chenopodii Oleum; U. S.

OIL OF CHENOPODIUM.

Chenopodii Ætheroleum—Volatile Oil of Chenopodium.—Oil of American Wormseed.

Description.—See the Pharmacopœia, page 235. Pale yellowish, of a very disagreeable odor.

Used for the same purposes as the drug itself, in doses of 0.25 to 0.5 cubic centimeter (4 to 8 minims).

Chiæ Semina.

CHIA SEED.

Salvia Espanola—Mexican Sage Seed.

Origin.—*Salvia columbaria* (*Labiatæ*).

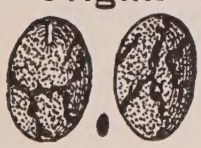


FIG. 150.—Chia Seed, natural size and enlarged.

Habitat.—Mexico, etc.

Small dark-brownish seeds, yielding an agreeable mucilaginous drink when put into cold water. It is used in Mexico for that purpose, the drink being flavored with orange.

Chimaphila; U. S.

CHIMAPHILA.

Chimaphilæ Folia—Doldenblüthiges Harnkraut, Wintergrün, G.; *Herbe de Pyrole umbellée*, F.; *Pipsissewa, Prince's Pine, Wintergreen.*

Origin.—*Chimaphila umbellata*, Nuttall (*Ericaceæ*).

Habitat.—North America.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 74.

Constituents.—They contain a colorless, bitter, crystalline, neutral principle called *arbutin*, and also an odorless and tasteless substance in

FIG. 151.—Chimaphila, twig and leaf, natural size.

yellow crystals called *chimaphilin*. The fresh leaves also contain some irritant principle.

Medicinal Uses.—Diuretic, alterative, astringent, and tonic. Used like uva ursi in *urinary disorders*.

Externally the fresh leaves, bruised and applied to the skin, produce vesication.

Only given in the form of fluid extract or infusion.

CHIMAPHILÆ DECOCTUM.

DECOCTION OF CHIMAPHILA.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 399.)

About the same strength as the preparation of 1870.

Dose.—One hundred cubic centimeters (3 fluidounces) every two or three hours.

CHIMAPHILÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF CHIMAPHILA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, two hundred and twenty-five grams (about 7½ fluidounces) water, and fifty grams (about 1⅘ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 7¼ fluidounces) of the first menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the second menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

China.

CHINA.

Chinæ Rhizoma—*Chinawurzel*, G.; *Squine*, *Racine de Chine*, F.; *Raiz del China*, Sp.; *Kinarot*, Sw.; *China Root*.

Origin.—*Smilax glabra*, Roxburgh; and *Smilax China*, Linné (*Smilaceæ*).

Habitat.—China and Japan.

Part used.—The rhizome.

Description.—Stout fibrous tubers from five to twenty centimeters (2 to 8 inches) long, two to six centimeters ($\frac{4}{5}$ to 2 inches) thick, knotty, dense, tough externally, reddish brown, with several deep, circular, funnel-shaped stem scars on the upper surface; interiorly pale pinkish or pale brownish-white, darker toward the centre. Inodorous; taste at first insipid, afterward bitterish; slightly astringent, and acrid. Contains numerous brown resin cells near the centre.

Must be heavy, hard, and sound, and not too pale.

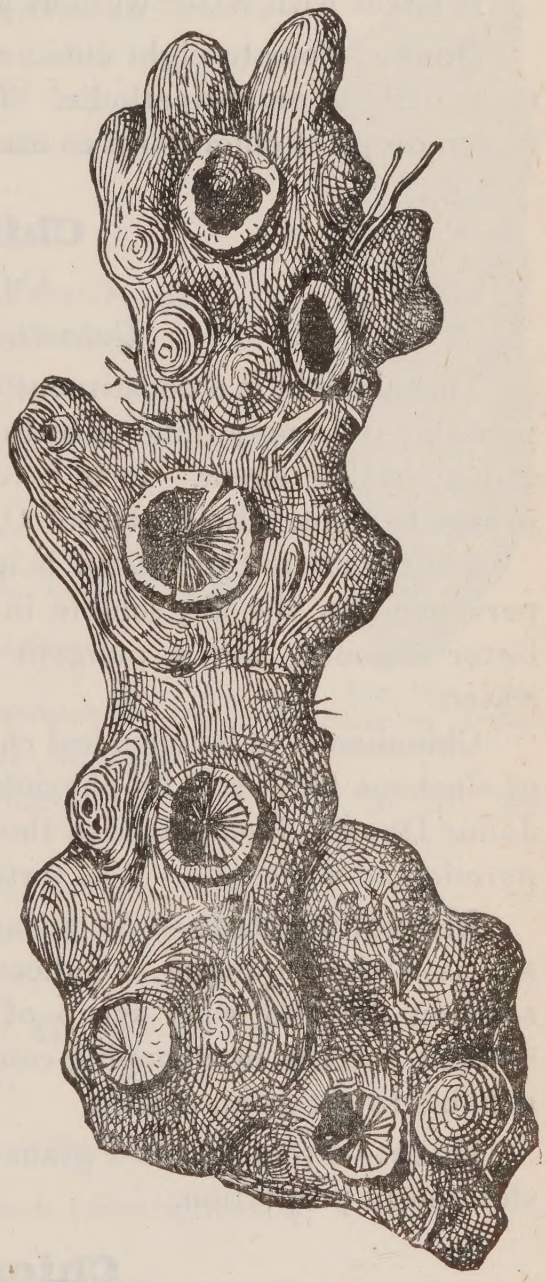


FIG. 152.—China Root, natural size.

Constituents.—Contains the same constituents as sarsaparilla, and has the same properties.

Medicinal Uses.—Similar to those of sarsaparilla, but somewhat more active.

Dose.—Two to five grams (30 to 75 grains) several times a day. Best given in fluid extract made with diluted alcohol as a menstruum.

Chinoidinum; U. S.

CHINOIDIN.—QUINOIDIN.

An amorphous, nearly black, resinous mass, of the consistence of hard pitch, containing a mixture of amorphous alkaloids, obtained from cinchona in the manufacture of quinine, etc.

Description and Tests.—See the Pharmacopœia, page 75.

Medicinal Uses.—This substance is employed as a cheap substitute for quinine. It is antiperiodic, but must be given in larger doses than quinine. It is best taken in pill form.

Dose.—0.2 to 1 gram (3 to 15 grains) several times a day.

CHINOIDINI TINCTURA.

TINCTURE OF CHINOIDIN.

The formula of the German and Scandinavian Pharmacopœias, using alcohol and hydrochloric acid of the strengths prescribed by the U. S.

Pharmacopœia for each respectively, is as follows: Dissolve thirty grams (463 grains) of chinoidin in a mixture of two hundred and forty grams (or about 10 fluidounces) of alcohol, 18.75 grams (290 grains) of hydrochloric acid, and 11.25 grams (182 minims) distilled water.

It mixes with water without precipitating.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms) three times daily as an antiperiodic. The taste may be improved by adding fifteen drops of chloroform to each fluidounce.

Chinolina.

CHINOLINE.

Quinoline; Leukoline.

This alkaloid is a constituent of coal tar. Recently it has been prepared by treating aniline or nitrobenzol with glycerin in the presence of a dehydrating agent. It is a colorless, oily liquid, darkening on exposure to light. Boils at 255° C.

TARTRATE OF CHINOLINE is in shining, silky crystals, comparatively permanent in the air, soluble in water. It has an odor reminding of bitter almonds, and a pungent taste resembling that of peppermint water.

Chinoline is in its chemical character closely related to the alkaloids of cinchona bark, and its physiological effects are also, according to Dr. Julius Donath, identical with those of quinine, being a powerful antipyretic and antiseptic. The tartrate is the salt chiefly used.

Medicinal Uses.—As an antipyretic in fevers, and in general in all cases where quinine is indicated. It is best given in wafers, or in solution flavored with syrup of raspberries. It has been used with marked success in whooping-cough and in diphtheria. Occasionally it is liable to act as an emetic.

Dose.—From 0.50 to 1 gram (8 to 16 grains) twice a day for adults; children in proportion.

Chionanthus.

CHIONANTHUS.

Fringe Tree Bark.

Origin.—*Chionanthus virginica*, Linné (*Oleaceæ*).

Habitat.—The United States, south of Pennsylvania.

Part used.—The bark of the root.

Description.—Irregular, either tortuous or nearly straight troughs and pieces, averaging from twenty-five to one hundred millimeters (1 to

4 inches) in length, and twelve to twenty-five millimeters ($\frac{1}{2}$ to 1 inch) in breadth; externally rough, brown, marked by warts; transverse ridges, and irregular scars. It is two to five millimeters ($\frac{1}{12}$ to $\frac{1}{5}$ inch) thick. The inner surface is pale brownish-yellow, finely striated. The bark is brittle, and its fracture is pale yellowish, or nearly white, with yellowish-brown spots, indicating the positions of bundles of bast cells; porous. Odor faint, slightly reminding of rancid cacao butter; taste bitter.

FIG. 153.—Chionanthus Bark, natural size.

Constituents.—No analysis.

Medicinal Uses.—Said to be alterative, aperient, and diuretic, and to have been of use in various forms of *intermittent*, *bilious*, and *typhoid fevers*.

Dose.—Two to eight grams ($\frac{1}{2}$ to 2 drachms); best given in the form of fluid extract.

CHIONANTHI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CHIONANTHUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Dose.—Five to ten cubic centimeters (1 to 2$\frac{1}{2}$ fluidrachms).

Chirata; U. S.

CHIRATA.

Chiratæ Herba—Chiretta.

Origin.—*Ophelia Chirata*, Griesbach (*Gentianaceæ*).

Habitat.—India.

Part used.—The whole plant.

Description.—See the Pharmacopœia, page 75. The drug comes in bundles, such as shown by the accompanying figure on next page.

Should be freed from the coarser woody stems, which contain none of the bitter constituents.

Chirata is more intensely bitter than gentian or other plants of the same natural order, and contains no tannin.

Constituents.—It contains two amorphous, bitter principles, named by their discoverer (Höhn) *ophelic acid* and *chiratin*, and pos-

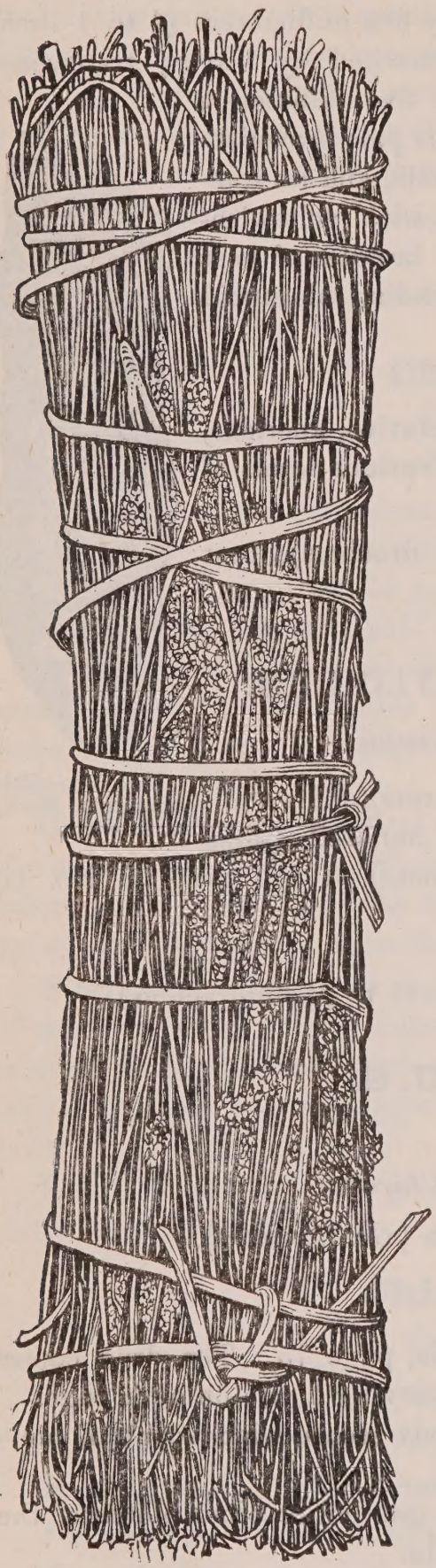


FIG. 154.—Bundle of Chirata, reduced to one-fifth natural size.

sibly also *chiratogenin*, another amorphous, bitter substance formed by the splitting up of the *ophelic* acid.

CHIRATÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF CHIRATA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, and two hundred and twenty-five grams (about 7½ fluidounces) water, and fifty grams (about 1⅘ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6⅓ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate. Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

CHIRATÆ INFUSUM.

INFUSION OF CHIRATA.

From fifteen grams (about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions under title "Infusa.")

About the same strength as the preparation of the British Pharmacopœia.

Dose.—Fifty to one hundred cubic centimeters (12 to 25 fluidrachms).

CHIRATÆ TINCTURA; U. S.

TINCTURE OF CHIRATA.

Moisten thirty grams (463 grains) chirata in No. 40 powder with thirty grams (about 1⅛ fluidounce) diluted alcohol; macerate twenty-four hours; pack tightly in a cylindrical percolator, and percolate with diluted alcohol until three hundred grams (10 fluidounces) tincture has been obtained.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Chloral; U. S.

CHLORAL.

Chloralicus Hydras—Chloral Hydrate, Hydrate of Chloral.

Description and Tests.—See the Pharmacopœia, page 75.

Only *separate* crystals which are colorless and transparent are permitted by the Pharmacopœia to be used. It must be dry, and at ordinary temperatures must have a rather pleasant ethereal odor, not acrid. When kept in a warm place its odor is acrid. Taste bitter and caustic. Reaction must be neutral. Opaque crusts or lumps of chloral hydrate (very commonly seen in the shops) must not be used, as they are generally very impure and extremely acrid from products of decomposition. Chloral (generally called hydrate of chloral) is freely soluble in water, alcohol, ether, chloroform, glycerin, benzol, benzin, bisulphide of carbon, fixed oils, and volatile oils. When triturated with crystallized carbolic acid, or with camphor, it forms with either substance a clear homogeneous liquid.

Preservation.—This preparation must be kept in bottles with well-ground glass stoppers in a cool and dark place.

Medicinal Uses.—Chloral produces a calm and refreshing sleep, in *sleeplessness* from bodily or mental overwork, anxiety or excitement, in *brain diseases*, *mania*, or *delirium tremens*.

It is useful in *puerperal mania, puerperal convulsions, convulsions of children* due to reflex irritation ; in *spasmodic asthma, whooping-cough, pseudo-croup, tetanus*, etc.; in *collapse of cholera, cholera morbus*, and in *strychnine poisoning*. In *sea-sickness* it is also of much use.

Chloral should not be given to relieve pain, as it does not have this effect except in dangerously large doses. Externally, cloths saturated in solution of chloral are an excellent antiseptic dressing to *foul ulcers*. This substance is also used as an injection to preserve cadavers in good condition for dissection.

Dose.—0.3 to 2 grams (5 to 30 grains). In *mania, delirium tremens, tetanus, convulsions*, etc., much larger doses may be required, but must be given with great caution, as 1.5 to 2 grams (20 to 30 grains) have been known to produce fatal results.

Poisonous Effects.—Chloral in overdoses produces profound narcotic poisoning, unconsciousness, superficial breathing, weak pulse, and great reduction of the temperature.

By destroying the functions of the cerebrum there occurs a relaxation of the muscular tissue which may include the involuntary muscles of respiration and of the heart, producing death by paralysis and failure of these vital organs. This is especially apt to occur in heart diseases, as fatty degeneration, atheroma, and in advanced diseases of the lungs. One of the authors has seen very alarming symptoms produced by a dose of 0.5 gram (7½ grains) of this remedy.

The above-described dangerous symptoms call for prompt stimulation by ammonia, alcohol, atropia, electricity, and artificial respiration. Artificial heat should be applied externally by means of jugs filled with warm water, and ammonia may be administered by subcutaneous injection.

SOLUTION FOR DISPENSING PURPOSES.

Dissolve one hundred grams (3 ounces 230 grains avoirdupois) of the chloral hydrate in enough distilled water to make the finished solution measure two hundred cubic centimeters (6¾ fluidounces). Filter. Each cubic centimeter of the solution contains one-half gram of the salt ; one hundred and five minims contain fifty grains. Should be frequently renewed, and not kept ready made unless constantly used.

Chloroformum Purificatum ; U. S.

PURIFIED CHLOROFORM.

Description and Tests.—See the Pharmacopœia, page 76. Chloroform has remarkable solvent properties, dissolving most alkaloids,

numerous resins, gutta-percha, caoutchouc, paraffine, iodine, bromine, fixed and volatile oils, etc.

The object of the purification of the commercial chloroform, as prescribed by the Pharmacopœia in the process for preparing the purified chloroform, is to destroy and remove the hydrocarbons that contaminate the crude or commercial article. The absence of all impurities, such as acids, free chlorine, aldehyd, and hydrocarbons should always be ascertained, for which purpose ample tests are prescribed by the Pharmacopœia. Chloroform is unfit for anæsthetic uses unless absolutely pure.

Preservation.—Purified chloroform should be kept in glass-stoppered bottles in a cool, dark place. It is not inflammable.

Medicinal Uses.—Chloroform is frequently employed as an anæsthetic, being given for this purpose by inhalation of its vapor mixed with a plentiful supply of atmospheric air. Its effect is often increased by the subcutaneous injection of morphine half an hour before its administration.

Care should be exercised that the patient is in a recumbent position, with the clothing, such as neckbands, waistbands, corsets, etc., perfectly loose. The inhalation of chloroform should not take place shortly after a meal as troublesome vomiting may occur.

No operation, even if only of a trifling character, should be undertaken until complete anæsthesia occurs, as otherwise there is much danger of paralysis of the heart from reflex action.

During the entire time, from the beginning of the inhalation until recovery is complete, the patient must be kept under close observation, and the pulse and respiration be carefully watched.

Chloroform inhalations are used in *surgical* and *obstetrical operations*, and also in *asthma*, *convulsions*, *spasm of the glottis*, and other *spasmodic troubles*. Also in *puerperal convulsions* and in *rigid os* during parturition, but in these cases it is apt to be followed by insufficient contraction of the uterus and post-partum hemorrhage.

Inhalations of chloroform are counter-indicated in shock, diseases of the brain, heart, or lungs, and in drunkards.

Internally chloroform is a sedative, valuable in *nausea*, *vomiting*, *flatulent*, *renal*, or *biliary colic*, *cough*, etc. It is best given by mixing it with three or four times its own volume of olive or sweet almond oil, and emulsifying the oil with acacia as if no chloroform were present.

Externally chloroform is often used as an anodyne embrocation in *neuralgia*, *rheumatism*, etc., generally mixed with oil to form a liniment.

Dose.—Internally, 0.1 to 2 cubic centimeters (2 to 30 minims).

Poisonous Effects.—In overdoses chloroform is an irritant poison,

producing violent inflammation of the stomach and bowels, excitement, followed by prostration, stupor, and death. There is no chemical antidote. Large draughts of oil, followed by emetics or the use of the stomach-pump, artificial respiration, galvanism, etc., may be employed, and the inflammatory after-effects be treated on general principles.

If dangerous symptoms, cessation of breathing or of the heart's action, or stertorous breathing, occur during the inhalation of chloroform, the administration must be at once suspended, the patient's tongue drawn forward to allow free access of air to the glottis, cold water dashed on the chest, and ammonia held to the nostrils for inhalation. If that does not suffice to restore respiration, no time should be lost in establishing artificial respiration, and in applying the electrodes of a galvanic battery to the respiratory muscles.

The body should be kept warm by artificial heat, and the head of the patient lowered by holding him on the table and raising the lower end. Efforts of resuscitation should be unabated until the patient recovers or is unmistakably dead.

Failure of the heart's action is generally fatal. It calls for acupuncture of the heart, galvano-puncture, subcutaneous injection of atropine, and the treatment given above. All efforts to restore the heart's failing action will probably prove ineffectual, but should be persevered in until all hope is gone.

CHLOROFORMI AQUA.

Chloroform Water.

Shake five grams (75 grains) purified chloroform with seven hundred and fifty cubic centimeters (25½ fluidounces) distilled water until perfectly dissolved.

To relieve *colic*. Also as a vehicle for nauseous medicines, such as castor oil, when it temporarily renders the gustatory nerve insensitive.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

CHLOROFORMI MISTURA; U. S.

Chloroform Mixture.

Triturate ten grams (154 grains) yolk of egg in a mortar until smooth; then add two grams (30 grains) camphor dissolved in eight grams (123 grains) chloroform, continuing the trituration, and finally add gradually eighty grams (2⅔ fluidounces) water, and make a uniform emulsion.

Dose.—About fifteen cubic centimeters (½ fluidounce).

CHLOROFORMI MIXTURA HYDROCYANATA.

COMPOUND CHLOROFORM MIXTURE.

Mix twenty-five centigrams (4 grains) morphine sulphate, fifty centigrams (8 grains) oil of peppermint, ten grams (154 grains) ether, ten grams alcohol, twenty-five grams (386 grains) diluted hydrocyanic acid, one hundred grams (3 ounces 230 grains) chloroform, and enough simple syrup to make the whole measure five hundred cubic centimeters (17 fluidounces).

This is a good substitute for Collis Browne's Chlorodyne.

Dose.—0.3 to 0.6 cubic centimeters (5 to 10 minims).

CHLOROFORMI SPIRITUS; U. S.

SPIRIT OF CHLOROFORM.

Mix thirty grams (or 1 ounce) purified chloroform, and two hundred and seventy grams (or 9 ounces) alcohol.

Dose.—Two to four cubic centimeters (30 to 60 minims).

Chloroformum Venale; U. S.

COMMERCIAL CHLOROFORM.

Description and Tests.—See the Pharmacopœia, page 77. A limpid liquid containing at least ninety-eight per cent. of real chloroform. Specific gravity not below 1.47.

Only traces of impurities are allowed in this chloroform, as will be seen from the official tests prescribed. The bulk of the chloroform manufactured and sold in this country will be found to stand the tests for commercial chloroform, while not answering the tests for purified chloroform.

Chloroform has remarkable solvent properties, dissolving most alkaloids, numerous resins, gutta-percha, caoutchouc, paraffin, iodine, bromine, fixed and volatile oils, etc. Sixteen ounces chloroform measures about $10\frac{1}{3}$ fluidounces.

Uses.—Commercial chloroform is intended for external use and for making the purified chloroform.

CHLOROFORMI LINIMENTUM; U. S.

CHLOROFORM LINIMENT.

Mix one hundred and twenty grams (4 ounces) commercial chloroform and one hundred and eighty grams (6 ounces) soap liniment.

This is a very different preparation from that of the Pharmacopœia of 1870, which was composed of three ounces purified chloroform and four ounces olive oil.

An anodyne liniment to relieve acute *pain* in *sciatica, neuralgia, rheumatism*, etc.

CHLOROFORMI LINIMENTUM COMPOSITUM.

COMPOUND CHLOROFORM LINIMENT.

Mix sixty cubic centimeters (2 fluidounces) soap liniment, thirty cubic centimeters (1 fluidounce) chloroform, and thirty cubic centimeters (1 fluidounce) oil of turpentine. The mixture is clear.

Chlorophyllum.

CHLOROPHYLL.

This is the green coloring matter of plants. It is of a resinous character, soluble in alcohol, and insoluble in water.

CHLOROPHYLLI TINCTURA.

Macerate two hundred and fifty grams (8 ounces 358 grains) recently dried spinach in one thousand cubic centimeters (34 fluidounces) alcohol, for five days; express and filter.

Used for coloring alcoholic liquids green. Many of the fluid and solid extracts in the market are colored green with this substance to make it appear as if they were prepared from fresh green leaves.

Chlorum.

CHLORINE.

Occurs in nature chiefly in combination with sodium as sodium chloride (common salt).

It is obtained free, in the gaseous state, by heating black oxide of manganese, with hydrochloric acid, or with hydrochloric and sulphuric acids mixed. (See Chlori Aqua.)

It is a greenish-yellow gas, having a strong, peculiar, suffocating odor. Can be condensed into a liquid by cold and compression. Its specific gravity is 2.45 (air being = 1). It is soluble in water, which at plus 9° C. (48.2° F.) is capable of absorbing three times its volume of chlorine gas.

Uses.—Chlorine has a powerful affinity for hydrogen. Hence its energetic bleaching properties, its unequalled disinfecting power, and its injurious effects on the respiratory organs when inhaled.

CHLORINE FUMIGATION.

For fumigating confined spaces with chlorine gas, which is the most powerful and certain disinfectant known, mix ten grams ($\frac{1}{3}$ ounce) common salt, five grams ($\frac{1}{6}$ ounce) black oxide of manganese, 7.50 grams ($\frac{1}{4}$

ounce) concentrated sulphuric acid, and 7.50 grams (¼ ounce) water, in a soup-plate or earthenware dish, and set this in the middle of the room. The quantities just named are ordinarily sufficient for the disinfection of twenty to thirty cubic meters (680 to 1,000 cubic feet), or a room ten by ten by ten feet. In fumigating with chlorine the room should be vacated, and all openings closed. In epidemics of infectious diseases like yellow fever, cholera, etc., fumigation with chlorine is the best means of purifying infected rooms or houses; but in such cases the quantities used must be very considerably increased—say, ninety grams (3 ounces) salt, forty-five grams (1½ ounce) black oxide of manganese, and seventy-five grams (2½ ounces) each of sulphuric acid and water, to a room twelve to fifteen feet square. Of course no one must be in the room while it is being fumigated as the gas is poisonous when inhaled in large quantities. Chlorine fumigation may also be effected by mixing fifty grams (1⅔ ounce) black oxide of manganese, in powder, with one hundred and fifty grams (5 ounces) crude hydrochloric acid; or by pouring vinegar on chlorinated lime.

Chlorine is also generated when a mixture of alcohol and a small quantity of chloroform is burned in a saucer. This is a convenient method for fumigating a room.

Chlori Aqua; U. S.

CHLORINE WATER.

Chlori Solutio; Aqua Chlorinii, Phar. 1870—*Chlorwasser*, G.; *Eau chlorée, Chlore liquide*, F.; *Aqua de Cloro*, Sp.; *Klorvatten*, Sw.

Preparation, Description, and **Tests.**—See the Pharmacopœia, page 43.

Prepared by conducting chlorine gas into distilled water and shaking them together until the distilled water is quite saturated with the chlorine.

Chlorine water is a greenish-yellow liquid, having the suffocating odor of chlorine. It instantly decolorizes dilute solutions of litmus or indigo.

The colorless, weak, so-called "chlorine water" usually seen does not answer this description.

Preservation.—It is necessary to keep the chlorine water in tightly glass-stoppered amber-colored bottles, completely filled so as to exclude air, and in a cool place. Otherwise it will soon spoil. Each time the stopper is removed some of the chlorine escapes. The chlorine water can be made much stronger than required by the Pharmacopœia (the

minimum being 0.4 per cent., while it may be readily obtained containing 0.6 per cent. chlorine), but it does not keep so long when stronger, and then soon contains hydrochloric acid.

Medicinal Uses.—Chlorine water is a disinfectant and antiseptic when locally applied. It is used in dilution for cleansing *foul ulcers* and *pustules*. Formerly it was much used internally in dilution to counteract or destroy the "disease germs" on which zymotic diseases are supposed to depend, as in *measles*, *scarlatina*, *small-pox*, etc.

It is not often used for this purpose now, except as a gargle in the *sore-throat* accompanying these ailments.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms) largely diluted. For a gargle, one part of chlorine water to seven parts of sweetened water.

Chloratæ Sodæ Liquor; U. S.

Solution of Chlorinated Soda.

Labarraque's Solution.

Triturate eighty grams (2 ounces 359 grains) of chlorinated lime into a smooth paste with four hundred cubic centimeters (13½ fluidounces) of water. Put it into a weighed jar with a well-fitting cover, or into a bottle which is to be corked. Dissolve one hundred grams (3 ounces 230 grains) carbonate of sodium in four hundred grams (13½ fluidounces) boiling water, and then pour this solution into the solution of chlorinated lime. Close the vessel tightly. When cold add enough water to make the whole one thousand grams (or about 33 fluidounces). Strain through bleached muslin, or let settle and draw off the clear solution with a siphon.

Preservation.—Must be kept in glass-stoppered bottles.

Description.—Clear, pale greenish, smelling faintly of chlorine; has a salty taste and an alkaline reaction. Specific gravity 1.044. The addition of any acid causes an evolution of chlorine and carbonic acid gas. It contains two per cent. of available chlorine, that is, the free chlorine which is liberated on the addition of an acid amounts to two per cent.

Employed as a topical disinfectant wash for *gangrenous* or *foul ulcers*, etc.

It is also used as a disinfectant for sinks, privies, water-closets, sewers, etc.; and in sick rooms, hospitals, prisons, ships, and wherever infectious material may be produced.

CHLORATA CATAPLASMA.

CHLORINATED POULTICE.

This is made by incorporating sixty grams (2 ounces) of solution of chlorinated soda with a poultice prepared from one hundred and twenty grams (4 ounces) flaxseed meal and two hundred and forty cubic centimeters (8 fluidounces) boiling water.

Used to cleanse and stimulate foul suppurating ulcers.

CHLORATUS LINCTUS.

CHLORINATED HONEY.

Mix fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) solution of chlorinated lime, sixty cubic centimeters (2 fluidounces) water, and sixty cubic centimeters (2 fluidounces) strained honey.

Chondrus; U. S.

CHONDRUS.

Fucus Crispus—Carrageen, Knorpeltang, Irländisches Moos, Perlmoos, G.; *Mousse marine perlée, Carragaheen, Mousse d'Irlande*, F.; *Musgo Marino Perlado*, Sp.; *Caragheen, Perlmossa*, Sw.; *Irish Moss.*

Origin.—Consists of the two sea-algæ *Chondrus crispus*, Lyngbye, and *Chondrus mamillosus*, Greville, bleached and dried by exposure to the sun.

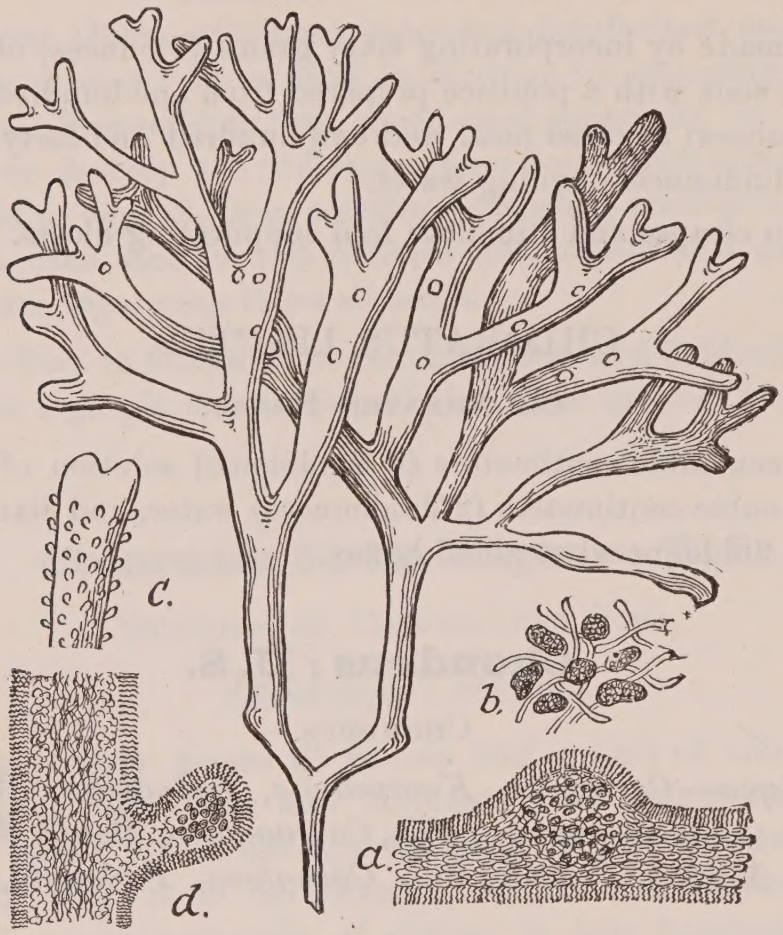
Habitat.—Both algæ occur on the rocky shores of the Atlantic and are collected on the coasts of New England and Ireland.

Description.—The first has elliptical *sori* or sporocarps imbedded in the branches, producing a depression on the opposite side; the second has spherical sori projecting from the surface on short stalks. The Chondrus mamillosa is of a darker brownish purple, and is of a looser texture than the Chondrus crispus.

The general appearance of chondrus is horny, translucent, pale yellowish white. The drug swells considerably in water, assuming its natural shape and becoming soft, slippery, and cartilaginous. Boiled with twenty to thirty parts water it forms a jelly of the somewhat saline mucilaginous taste of the drug and a distinct seaweed odor. Must be light colored and clean.

Constituents.—Chondrus contains *mucilage* to the extent of nearly

ninety per cent. Starch is absent. Traces of iodine and bromine are found in the ash. Nitrogen is present to the extent of one per cent.



FIGS. 155–159.—Chondrus, natural size, after soaking in water. *a*, section through sporocarp, enlarged; *b*, small bodies in sporocarp; *c*, small piece of chondrus mamillosus; *d*, section through a sporocarp, enlarged.

Medicinal Uses.—A demulcent and nutrient substance, but without the virtues generally ascribed to it by the laity in pulmonary and bronchial affections.

CHONDRI GELATINUM.

CARRAGEEN JELLY.

Boil sixty grams (2 ounces) chondrus in one liter (34 fluidounces) water for one hour. Strain. Dissolve ninety grams (3 ounces) sugar in the decoction while hot. Set aside to cool.

Chromum.

CHROMIUM.

Comparatively rare. Occurs associated with iron, which it resembles in its chemical behavior.

When containing water the salts of chromium have a bluish or green color. The salts of chromic acid are yellow or red.

Chrysarobinum; U. S.

CHRYSAROBIN.

"Chrysophanic Acid."

See the Pharmacopœia, page 77.

This is the substance generally known, prescribed, and dispensed under the name of "Chrysophanic Acid." It is a yellow crystalline powder extracted from goa-powder (Araroba) (which see).

Chrysarobin is odorless, tasteless, nearly insoluble in water, slightly soluble in alcohol, but quite soluble in ether and in boiling benzol. It resembles chrysophanic acid so nearly that it was first supposed to be identical with it. (See Acid. Chrysophanicum.)

Uses.—This is a valuable remedy in *parasitic skin diseases* of a vegetable origin and superficial character. It is especially useful in *psoriasis*, and is the best remedy for this troublesome disease. It should be used with caution about the face as it is irritant.

The yellow stains which it produces on the skin or clothing may be removed with a weak solution of chlorinated lime. It is usually applied in the form of an ointment containing from five to fifteen per cent. of this drug.

Chrysarobin has also been given internally with success in cases of *psoriasis*, etc., in doses of eight milligrams ($\frac{1}{8}$ grain), gradually increased.

CHRYSAROBINI UNGUENTUM; U. S.

CHRYSAROBIN OINTMENT.

Mix ten grams (154 grains) chrysarobin intimately with ninety grams (3 ounces 76 grains) benzoinated lard.

Cichorium.

CHICORY.

Succory.

Origin.—The root of *Cichorium intybus*, Linné (*Compositæ*).

Habitat.—Europe and North America. Cultivated in Europe.

Description.—Resembles taraxacum, but is of a lighter color, and the laticiferous vessels are in chicory radiating instead of concentrically arranged.

Contains a bitter substance, besides *inulin*, etc. Roasted chicory is a common adulterant in ground coffee.

Medicinal Uses.—Seldom employed in medicine. Tonic, laxative, and diuretic. Supposed to be especially indicated in hepatic derangements.

Dose.—Two to five grams (30 to 75 grains) several times a day.

Cimicifuga ; U. S.

CIMICIFUGA.

Cimicifugæ Radix—Black Cohosh, Bugbane, Black Snake Root.

Origin.—*Cimicifuga racemosa*, Elliott (*Ranunculaceæ*).

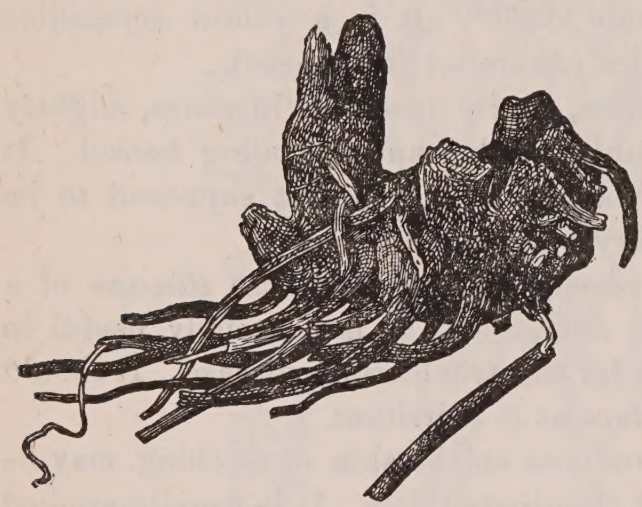


FIG. 160.—Cimicifuga, natural size.

Habitat.—North America.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 78, and the figures. The rootlets have from three to five or six woody rays, often dividing near the cambium zone. In the middle bark is a layer of cells somewhat resembling the *nucleus sheath* of monocotyledons.

Constituents.—A neutral principle of intensely acrid taste has been extracted from the fresh root which is soluble in water, dilute alcohol, chloroform, or ether. Its chemical character is not known, nor has it been named.

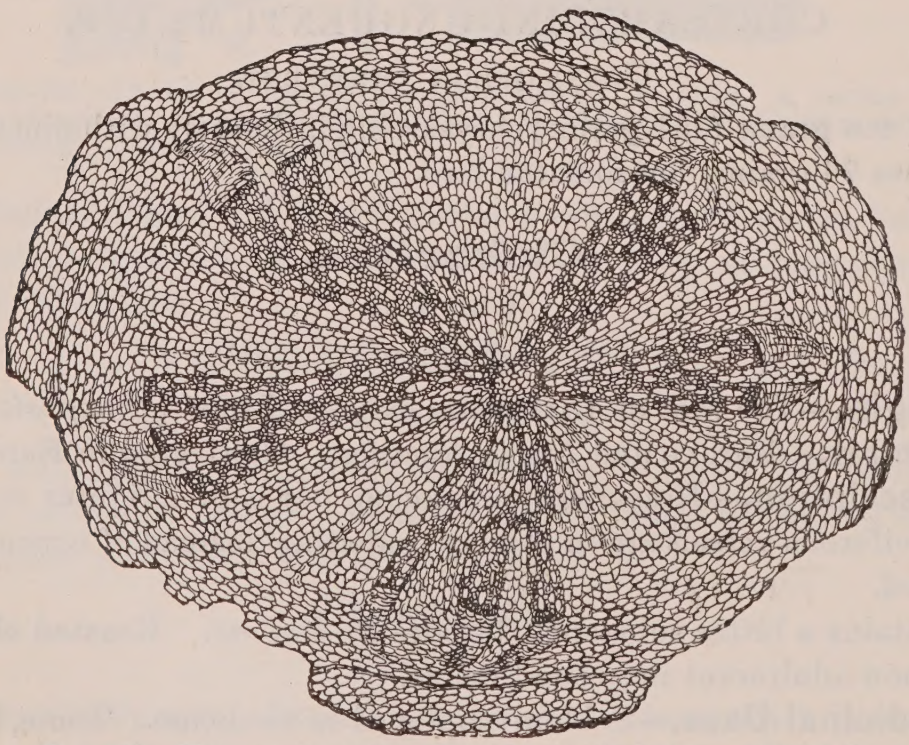


FIG. 161.—Transverse section of rootlet of Cimicifuga, magnified.

Cimicifugin, or *macrotin*, is the "resinoid" obtained by precipitation from a strong alcoholic tincture with water.

Medicinal Uses.—Cimicifuga is used in a large number and variety of diseases. It is a sedative to the nervous and circulatory systems, producing nervous depression and weakened pulse if given in large doses. It is used to allay *pain*, reduce the frequency and force of the pulse, and prevent *cerebral congestions*. It does not produce alarming narcotic effects. In smaller doses it is used as a tonic. It is also used in *rheumatism*, *lumbago*, and in disturbances of the menstrual functions, as in *amenorrhœa*, *ovarian inflammation*, etc.

Externally a saturated tincture is used to relieve pain in *rheumatism*, *neuralgia*, and similar affections. The best and most reliable form of administering this drug is the fluid extract.

Dose of powdered cimicifuga, 1.5 to 2 grams (20 to 30 grains).

CIMICIFUGÆ DECOCTUM.

Decoction of Cimicifuga.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms).

CIMICIFUGÆ EXTRACTUM.

Extract of Cimicifuga.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brownish black.

Dose.—0.05 to 0.3 gram (1 to 5 grains), three times a day.

CIMICIFUGÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Cimicifuga.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol. Moisten the drug with one hundred and twenty-five grams (about $5\frac{1}{5}$ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters ($15\frac{1}{4}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then

dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

CIMICIFUGÆ SYRUPUS COMPOSITUS.

COMPOUND SYRUP OF CIMICIFUGA.

Compound Syrup of Actæa.

Mix sixty cubic centimeters (2 fluidounces) fluid extract of cimicifuga, thirty cubic centimeters (1 fluidounce) fluid extract of senega, fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) fluid extract of ipecacuanha, sixty cubic centimeters (2 fluidounces) fluid extract of glycyrrhiza, sixty cubic centimeters (2 fluidounces) fluid extract of wild cherry bark, and one thousand two hundred cubic centimeters (40 fluidounces) simple syrup.

Dose.—Two to four cubic centimeters (30 to 60 minims), in cough mixtures.

CIMICIFUGÆ TINCTURA; U. S.

TINCTURE OF CIMICIFUGA.

Moisten one hundred grams (3 ounces 230 grains) cimicifuga in No. 60 powder with ninety cubic centimeters (3 fluidounces) alcohol; macerate twenty-four hours; then pack it firmly in a cylindrical percolator and percolate with alcohol until five hundred grams (17 ounces 280 grains—measuring about $20\frac{1}{2}$ fluidounces) of tincture has been obtained.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Cinchona; U. S.

CINCHONA.

Cinchonæ Cortex, Chinæ Cortex—Chinarinde, G.; *Quinquina, Écorce de Quinquina*, F.; *Quina*, Sp.; *Kinabark*, Sw.; *Peruvian Bark.*

Origin.—Several species and varieties of *Cinchona.* [*Rubiaceæ*, (*Cinchoneæ*).]

Habitat.—South America, on the eastern slope of the Andes, in Bolivia, Peru, Ecuador, Venezuela, and New Granada. Now largely cultivated in Java and India, the barks from the extensive plantations in these countries being at present those most sought after.

Description.—They are yellowish-brown or reddish-brown, of fibrous

fracture, bitter astringent taste, and only a faint odor (except loxa bark, which has a distinctive odor).

Bark from young stems and branches is of a grayish tint, while the liber or solid bark of old trunks possesses the characteristic shades of brown which are looked for in select cinchona bark.

Varieties.—The principal kinds are Cinchona Flava (p. 333), Cinchona Pallida (p. 337), and Cinchona Rubra (p. 338). See, also, p. 340.

Standard Strength.—By the term "cinchona" is meant, according to the new Pharmacopœia, any cinchona bark containing not less than three per cent. of total cinchona alkaloids, of which the only important ones are quinine, quinidine, cinchonine, and cinchonidine.

Processes of assay are now given in the Pharmacopœia both for ascertaining the total quantity of all the alkaloids in cinchona barks, and for finding the quantity of quinine alone. (See Pharmacopœia, pages 78 and 79.)

A good deal of bark is bought and sold and used in medicine under the name of Cinchona, "Pale Cinchona," "Commercial Calisaya Bark," "Commercial Red Bark," etc., which is not fit to be sold under any name apt to convey the impression that the drug is a fair average quality of cinchona. Some of the "commercial" bark which we have seen is not cinchona at all. Price-lists and invoices quoting cinchona bark at a few cents per pound, and fluid extract of cinchona at a much lower price than the materials would cost if it were made in accordance with the pharmacopœial requirements, leave no room for doubt concerning their quality.

The Pharmacopœia of 1870 having failed to fix the minimum percentage of alkaloids in pale cinchona, that term seems to be applied not only to good pale cinchona, and to the most inferior kinds of loxa bark, but also to barks destitute of alkaloids.

Test.—A very simple, convenient, and reliable test by which the genuineness (and roughly even the relative quantity of alkaloids) of cinchona barks of any kind may be ascertained is the following:

Put a small quantity of the powdered bark into a long test-tube and heat it in the flame of a spirit lamp, or a gas flame, holding the test-tube in an oblique direction. If the bark contains any cinchona alkaloids a handsomely red, oily liquid will collect in the upper part of the tube, whereas if no cinchona alkaloids are present only the usual brown products of destructive distillation will be formed.

Constituents.—The constituents of cinchona barks in general are: 1, alkaloids—quinine, quinidine, cinchonine, cinchonidine, quinamine, and conquinamine; 2, acids—kinic, cincho-tannic, and quinovic acids—none of which has any medical value except the cincho-tannic acid, which

is astringent ; 3, the different amorphous substances—quinovin and cinchona red, the former of which is a bitter principle, while the latter is a product of cincho-tannic acid, and is abundant in red bark.

The alkaloids are the important constituents. The proportion of total alkaloids, as well as the relative proportion of one alkaloid as compared with that of another, are subject to great variation.

In India the total alkaloids are extracted from cinchona barks by means of acidulated water, precipitated with soda, and dried, the product, which is called "cinchona febrifuge," being very extensively used, especially by the British Government, for the treatment of fevers among the troops. The average composition of the cinchona febrifuge was fifteen and one-half per cent. quinine, thirty-three and one-half per cent. cinchonine, twenty-nine per cent. cinchonidine, seventeen per cent. amorphous alkaloids, and five per cent. coloring matters. Dr. De Vrij's *Quinetum* is of similar character.

Quinine and quinidine possess about equal medicinal powers. Quinidine, however, occurs in but small quantities in the barks. Cinchonidine, of which a large quantity is obtained from red bark, comes next in antiperiodic effect, and one and one-half grain of it equals one grain of quinine or quinidine. Cinchonine is less powerful and less certain.

Quinine in Bark other than Cinchona.—It was until recently supposed that quinine and the other cinchona alkaloids did not exist in any other plants except the cinchonas. This has proved to be erroneous. At least two species of the genus Remijia have been found to furnish barks containing quinine which are now articles of commerce under the name of "Cuprea Bark."

Medicinal Uses.—Cinchona is a most valuable astringent bitter tonic, increasing the appetite and digestion. On account of its astringency it cannot be given for this purpose for any great length of time as it then causes constipation and deranges the digestion. Cinchona is also an antiseptic, the alkaloid quinia proving very destructive to lower organisms, on which account powdered cinchona applied to *offensive ulcers, putrid sore throat,* etc., rapidly cleanses the wounds.

While it is true in a general sense that cinchona owes its action to the alkaloids, especially quinine, these are not the only active constituents, since cinchona in powder or in the form of fluid extract possesses valuable effects due to the natural combination of its constituents, which are not produced by the isolated alkaloids.

Cinchona and its alkaloids are stated to be tonic, febrifuge, and antiperiodic, but the first of these properties is exerted best by the drug itself, the last best by its isolated alkaloid quinine, or its salts.

When simply a tonic is required, as in general debility, deficient

digestion, convalescence, etc., no preparations prove more valuable than those of cinchona, or, if there be also anæmia, a combination of cinchona with iron salts.

For most other diseases in which this drug is employed the alkaloids will either do just as good or better service, especially if these troubles be of malarial origin or of a periodic character.

Dose.—As a tonic four grams (60 grains) of the powder three times daily ; but cinchona is seldom given in this form, the fluid extract being a much more eligible mode of administering it. As an antiperiodic from half to one ounce is required, but it is probably never given in this form now, the alkaloids being in universal use.

Cinchona Flava ; U. S.

YELLOW CINCHONA.

Cinchonæ Calisayæ Cortex, Cinchona Regia, China Regia—Königschina, Calisayarinde, G. ; *Quinquina Calisaya, Quinquina jaune royal*, F. ; *Quina Calisaya, Quina Amarilla*, Sp. ; *Kungskina*, Sw. ; *Calisaya Bark.*

Origin.—*Cinchona Calisaya*, Weddell (*Rubiaceæ, Cinchoneæ*).

Habitat.—Peru and Bolivia. Also cultivated in India.

Part used.—The bark of the trunk or branches, when containing not less than two per cent. *quinine* (not merely two per cent. of total alkaloids).

Description.—See the Pharmacopœia, pages 79 and 80.

The calisaya bark is the most valuable of the cinchona barks, containing more quinine proportionately than any other. Good specimens of flat calisaya contain five or six per cent. quinine, and a variety of yellow cinchona, called *Cinchona ledgeriana* (cultivated in Java), is the richest in quinine, containing sometimes up to as much as thirteen and one-fourth per cent. of that alkaloid.

Good flat calisaya is now difficult to find in this market. Cultivated calisaya in troughs or quills of excellent quality can be readily had.

Uses.—As described under *Cinchona.* This is the best bark to be used simply as a tonic.

CINCHONÆ FLAVÆ DECOCTUM.

DECOCTION OF YELLOW CINCHONA.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms) three to six times a day.

CINCHONÆ EXTRACTUM; U. S.

Extract of Cinchona.

From five hundred grams (17⅔ avoirdupois ounces) of yellow cinchona, in No. 60 powder.

As a *menstruum* use first a mixture of fifteen hundred grams (62½ fluidounces) alcohol and five hundred grams (17 fluidounces) water, and afterward diluted alcohol as much as required. Moisten the powder with one hundred and seventy-five grams (about 7 fluidounces). Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Then percolate until the cinchona is exhausted, or fifteen hundred grams (about 56 fluidounces) of percolate has been received. Recover the alcohol in the usual way, and evaporate the remainder to solid extract, to which add one-twentieth of its weight of glycerin, and mix thoroughly.

Reddish-brown.

Dose.—0.50 to 2 grams (8 to 30 grains).

CINCHONÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Cinchona [Calisaya].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *first menstruum* use a mixture of three hundred and seventy-five grams (about 15⅔ fluidounces) alcohol and one hundred and twenty-five grams (about 4⅖ avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and seventy-five cubic centimeters (12⅔ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted. Evaporate the *second percolate* to the consistence of

honey, and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to five cubic centimeters (15 to 75 minims).

CINCHONÆ EXTRACTUM FLUIDUM AROMATICUM.

Aromatic Fluid Extract of Cinchona.

To make five hundred cubic centimeters (or its equivalent—17 fluidounces), use four hundred grams (14 ounces 48 grains) yellow cinchona, in No. 60 powder, and one hundred grams (3 ounces 230 grains) aromatic powder.

As a *first menstruum* use a mixture of four hundred and seventy-five cubic centimeters (16 fluidounces) alcohol and one hundred and twenty grams (4 ounces 100 grains) glycerin.

As a *second menstruum* use alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

CINCHONÆ EXTRACTUM FLUIDUM DETANNATUM.

Detannated Fluid Extract of Cinchona.

Macerate one liter (34 fluidounces) fluid extract of cinchona for several days with four hundred grams (14 ounces) freshly precipitated, well-washed and still moist ferric hydrate, shaking frequently, until the liquid, after filtration, no longer forms a precipitate with tincture of chloride of iron.

CINCHONÆ EXTRACTUM LIQUIDUM, B.

Liquid Extract of Cinchona.

Macerate 453.6 grams (16 ounces) yellow cinchona in coarse powder with one thousand two hundred cubic centimeters (40 fluidounces) water for twenty-four hours; then pack it in a cylindrical percolator, and percolate with water until about seven thousand cubic centimeters (240 fluidounces) has been collected, or until the bark is exhausted. Evaporate the percolate to six hundred cubic centimeters (20 fluidounces) at a temperature not exceeding 70° C. (158° F.), filter, and afterward continue the evaporation until only about ninety cubic centimeters (3 fluidounces) remain, or until the liquid has, when cold, a specific gravity of 1.20. Then add gradually thirty cubic centimeters (1 fluidounce) rectified spirit, stirring constantly.

It will be observed that the only solvent employed in making this preparation is water, the alcohol being added afterward to preserve it. This extract therefore differs widely from the U. S. fluid extract, both in character and strength.

Dose.—One to two cubic centimeters (15 to 30 minims).

CINCHONÆ INFUSUM; U. S.

Infusion of Cinchona.

Mix five grams (75 grains) of aromatic sulphuric acid with two hundred and fifty cubic centimeters (8½ fluidounces) of water, and moisten thirty grams (1 avoirdupois ounce) of cinchona in No. 40 powder with fifteen grams (½ fluidounce) of the mixture. Then pack the moistened drug into a conical glass percolator and gradually pour upon it, first, the remainder of the mixture, and afterward enough water, continuing the percolation until five hundred grams (about 17 fluidounces) of percolate has been obtained.

The Pharmacopœia directs that when the variety of cinchona bark to be used is not specified by the physician, yellow cinchona (calisaya bark) must be used.

This preparation contains all of the active constituents of cinchona in combination, and is a valuable bitter tonic. Useful in derangements of the digestion and as an appetizer during convalescence from severe sickness.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 24 fluidrachms) several times a day.

CINCHONÆ TINCTURA; U. S.

Tincture of Cinchona.

Mix one hundred grams (2 ounces 230 grains) glycerin, six hundred and fifty grams (22 ounces 406 grains, or about 28 fluidounces) alcohol, and two hundred and fifty cubic centimeters (8½ fluidounces) water. Moisten two hundred grams (7 ounces 24 grains) yellow cinchona, in No. 60 powder, with two hundred grams (7 ounces 24 grains, or about 7½ fluidounces) of this mixture. Macerate twenty-four hours. Pack it tightly in a cylindrical glass percolator. Now percolate, first with the remainder of the mixture, and afterward with a mixture consisting of alcohol and water in the proportion of one hundred and fifty-six grams (5 ounces 220 grains, or about 6½ fluidounces) alcohol to every

sixty cubic centimeters (2 fluidounces) water. Continue the percolation with the latter menstruum until one thousand grams (about 38 fluidounces) of tincture have been obtained.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

CINCHONÆ TINCTURA DETANNATA.

DETANNATED TINCTURE OF CINCHONA.

Macerate one thousand cubic centimeters (34 fluidounces) tincture of cinchona with eighty grams (2 ounces 360 grains) freshly precipitated, well washed, and still moist ferric hydrate, shaking frequently, for several days, until the liquid after filtration no longer is blackened by the addition of tincture of chloride of iron.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

CINCHONÆ VINUM, G.

WINE OF CINCHONA.

Chinæ Vinum—Chinawein, G.

Macerate fifteen grams ($\frac{1}{2}$ ounce) coarsely powdered yellow cinchona for eight days with three hundred cubic centimeters (10 fluidounces) port wine. Express and filter.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

Cinchona Pallida.

PALE CINCHONA.

Cinchonæ Pallidæ Cortex, Cinchona Grisea, China Fusca—Braune Chinarinde, Graue Chinarinde, Loxarinde, Kronchina, G.; *Quinquina gris de Loxa*, F.; *Quina de Loja*, Sp.; *Grå Kinabark*, Sw.; *Loxa Bark, Crown Bark.*

Origin.—*Cinchona officinalis*, Hooker.

Habitat.—Ecuador.

Description.—Small quills or troughs, from three to eighteen millimeters ($\frac{1}{8}$ to $\frac{3}{4}$ inch) in diameter, and of two millimeters ($\frac{1}{12}$ inch) or less thickness. Brownish-gray. Breaks easily with short fibres. Has a distinct, peculiar, though not strong odor.

South American loxa bark, or pale bark, is of variable quality. Some of the drug sold contains little quinine. Good loxa bark can be had,

however, containing over two per cent. alkaloids, and some of the pale bark cultivated on the cinchona plantations in India is quite rich. This rich pale bark unfortunately does not reach our market.

Used as an antiseptic astringent. As such it is an excellent and valuable remedy, depending upon its cinchotannic acid for its astringent properties, and upon its quinine and other alkaloids for the antiseptic powers it unmistakably possesses.

It is also used as a bitter tonic like the other cinchona barks.

Dose.—Two to five grams (30 to 75 grains).

CINCHONÆ PALLIDÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PALE CINCHONA.

Made as fluid extract of yellow cinchona, using same menstruum, and five hundred grams (or $17\frac{2}{3}$ avoirdupois ounces) of pale cinchona, in No. 60 powder, to obtain five hundred cubic centimeters (or 17 fluid-ounces) of the fluid extract.

Dose.—About five cubic centimeters ($1\frac{1}{4}$ fluidrachm).

Cinchona Rubra; U. S.

RED CINCHONA.

Cinchonæ Rubræ Cortex—*China Rubra*—*Rothe Chinarinde*, G.; *Quinquina rouge*, F.; *Röd Kinabark*, Sw.; *Red Bark*, *Red Peruvian Bark*.

Origin.—*Cinchona succirubra*, Pavon.

Habitat.—Ecuador. Cultivated on extensive plantations in Java, Ceylon, etc.

Part used.—The bark from the trunk and the branches.

Standard Strength.—Must contain not less than two per cent. *quinine* (not two per cent. of total alkaloids only).

Description.—See the Pharmacopœia, page 80. The fracture of red cinchona is less coarse than that of calisaya bark.

The larger the pieces the better the quality of the bark. Flat South American red cinchona is, however, generally poorer than the cultivated Indian quill red cinchona, which sometimes contains as much as ten per cent. of total alkaloids, one-third quinine.

"Cinchona Shavings" of excellent quality are now taken from living trees at the Ceylon plantations and imported to this market.

Constituents.—The red color of this variety of cinchona is due to *cinchona red*, an amorphous powder of indefinite composition, containing, besides coloring matter, some cinchotannic acid, starch and traces of alkaloids, as usually precipitated from hot acidulated infusions on cool-

ing. The red cinchona contains much more *cinchona red* than the other kinds of cinchona bark.

There is a larger proportion of cinchonine and cinchonidine in red bark than in yellow, in proportion to the quinine. Red cinchona also contains less quinine, as a general rule, than yellow cinchona.

Medicinal Uses.—As described under *Cinchona.* Red bark is decidedly more astringent than the yellow bark, and is to be preferred as a tonic when the debility is accompanied with a relaxed condition of the bowels.

Dose.—Two to five grams (30 to 75 grains) in powder.

CINCHONÆ RUBRÆ DECOCTUM.

DECOCTION OF RED CINCHONA.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms) three to six times a day.

CINCHONÆ RUBRÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF RED CINCHONA.

Prepared from red cinchona, in No. 60 powder, in the same manner as fluid extract of yellow cinchona, using the same menstruum.

Dose.—One to five cubic centimeters (15 to 75 minims).

May be detannated in the same manner as the fluid extract of yellow cinchona.

CINCHONÆ EXTRACTUM FLUIDUM COMPOSITUM.

COMPOUND FLUID EXTRACT OF CINCHONA.

To make five hundred cubic centimeters (or 17 fluidounces), use two hundred and fifty grams (8 ounces 358 grains) red cinchona, two hundred grams (7 ounces 24 grains) bitter orange peel, and fifty grams (1 ounce 334 grains) serpentaria, all in No. 60 powder.

As a *first menstruum* use a mixture of four hundred and seventy-five cubic centimeters (16 fluidounces) alcohol and one hundred grams (3 ounces 230 grains) glycerin.

As a *second menstruum* use alcohol.

This fluid extract is *twice* the strength of the compound fluid extract of cinchona usually sold and five times the strength of the compound tincture.

Dose.—One to five cubic centimeters (15 to 75 minims).

CINCHONÆ TINCTURA COMPOSITA; U. S.

COMPOUND TINCTURE OF CINCHONA.

Mix one hundred grams (3 ounces 230 grains) glycerin, eight hundred grams (28 ounces 96 grains, measuring about 33 fluidounces) alcohol, and one hundred cubic centimeters (3½ fluidounces) water. Mix also one hundred grams (3 ounces 23 grains) red cinchona, eighty grams (2 ounces 360 grains) bitter orange peel, and twenty grams (308 grains) serpentaria, all in No. 60 powder. Moisten the mixed powder with two hundred grams (or 8 fluidounces) of the menstruum. Macerate twenty-four hours. Pack tightly in a cylindrical glass percolator. Pour on the remainder of the mixture. Continue the percolation with a mixture of alcohol and water made in the proportion of two hundred and forty grams (8 ounces 204 grains, measuring about 10 fluidounces) alcohol to each thirty cubic centimeters (1 fluidounce) water, until one thousand grams (or 34 fluidounces) tincture has been obtained.

Dose.—Two to eight cubic centimeters (½ to 2 fluidrachms).

HUXHAM'S TINCTURE OF BARK (1788).

This preparation is still used. It is made by digesting for three or four days one hundred and twenty grams (4 ounces) powdered red cinchona, ninety grams (3 ounces) orange peel, 5.20 grams (80 grains) serpentaria, 10.40 grams (160 grains) Spanish saffron, and 5.20 grams (80 grains) cochineal, in twelve hundred cubic centimeters (40 fluidounces) brandy, and then expressing and filtering.

Dose.—Two to eight cubic centimeters (½ to 2 fluidrachms).

May be detannated in the same manner as the tincture of cinchona.

Ferrated Huxham's tincture of bark (ferrated compound tincture of cinchona) is obtained by adding to one liter (34 fluidounces) of the above tincture a solution of twenty grams (308 grains) soluble phosphate of iron in thirty cubic centimeters (1 fluidounce) hot water.

Dose.—About five cubic centimeters (one teaspoonful).

MISCELLANEOUS CINCHONA BARKS USED FOR THE MANUFACTURE OF QUININE.

Columbian or *Carthagena* barks and Pitáya bark are not used in pharmacy. They vary considerably as to the percentage of alkaloids they contain. They are generally of a brown or orange-brown color.

Cuprea barks have lately become a source from which the alkaloids, heretofore supposed to be peculiar to the cinchonas, are extracted. (See "Cinchona Cuprea.")

Cinchona Cuprea.

CUPREA BARK.

Origin.—The bark of *Remijia Purdieana*, Weddel, and *Remijia pedunculata*, Triana.

Description.—Hard, very compact, comparatively heavy. Epidermis of a dull coppery color ; inner surface smooth, wine-red. Fracture not fibrous.

Constituents.—They contain quinine, quinidine, and cinchonine, but no cinchonidine has yet been found in them. A new alkaloid, *cinchonamine*, has been found in the bark of the Remijia Purdieana, but not in the other variety of cuprea bark.

The percentage of quinine varies, two per cent. being the maximum. There is more quinidine in cuprea than in the barks of the cinchonas.

Habitat.—These barks are from Colombia, South America, and are used by quinine manufacturers.

Cinchonicina.

CINCHONICINE.

Cinchonicia.

The amorphous base produced by fusing cinchonine or cinchonidine in the presence of an acid.

Medicinal Uses.—Similar to those of quinine, but weaker and uncertain.

Dose.—0.05 to 1.5 gram (1 to 20 grains).

Cinchonidina.

CINCHONIDINE.

Cinchonidia.

An alkaloid in anhydrous crystals. Soluble in seventy-six parts of ether, and in twenty parts of alcohol. Readily soluble without fluorescence in dilute acids. Its solution in water with the aid of diluted acid does not give a green color or precipitate with chlorine water and ammonia. (See Quinine.)

Medicinal Uses.—Cinchonidina and its salts may be employed for the same purposes as quinina. It is somewhat less active, and slightly larger doses must be given to obtain an equal effect. Its action is almost equal to that of quinina.

Dose.—0.05 to 1.5 gram (1 to 20 grains), according to the effect desired, the smaller doses being used as tonics, the larger as antiperiodics.

Cinchonidinæ Sulphas; U. S.

SULPHATE OF CINCHONIDINE.

Sulphate of Cinchonidia.

Description.—See the Pharmacopœia, page 80. Its appearance resembles that of sulphate of quinine. An acidulated solution of it is, however, not fluorescent, as an acid solution of sulphate of quinine always is. Moreover, the salts of cinchonidine do not give a green color or a green precipitate with chlorine water and ammonia, as do the quinine salts.

Dose.—0.05 to 1.5 gram (1 to 20 grains).

Cinchonina; U. S.

CINCHONINE.

Cinchonia.

Description.—See the Pharmacopœia, page 81. White anhydrous crystals, requiring three hundred and seventy-one parts of ether for their solution. Aqueous solutions of its salts with a little diluted sulphuric acid added do not show a blue fluorescence, as similar solutions of the salts of quinine. The alkaloid is soluble in one hundred and ten parts alcohol. Readily soluble in dilute acids. (See Quinine.)

Medicinal Uses.—Similar to those of quinine, but less certain and active.

Dose.—0.05 to 1.5 gram (1 to 20 grains), the larger doses being antiperiodic.

CINCHONINÆ PULVIS COMPOSITUS.

COMPOUND POWDER OF CINCHONINE.

Mix sixteen grams (247 grains) cinchonine, 1.50 gram (23 grains) sodium bicarbonate, and 88.50 grams (3 ounces 45 grains) sugar of milk, all in fine powder.

Cinchoninæ Hydrochloras.

HYDROCHLORATE OF CINCHONINE.

Muriate of Cinchonia.

A white salt, in fine silky needles, resembling quinine sulphate in appearance. It contains eighty-one per cent. of cinchonine, and is soluble in twenty-four parts of water, and in less than twice its weight of eighty per cent. alcohol.

By the white precipitate its solution forms with solution of silver nitrate, and also by the absence of blue fluorescence in an acid solution, the cinchonine hydrochlorate is readily distinguished from sulphate of quinine.

Dose.—0.05 to 1.5 gram (1 to 20 grains).

Cinchoninæ Sulphas; U. S.

SULPHATE OF CINCHONINE.

Sulphate of Cinchonia.

Description and Tests.—See the Pharmacopœia, page 81.

Dose.—0.05 to 1.5 gram (1 to 20 grains).

Cinnamomum; U. S.

CINNAMON.

Cinnamomi Cortex—Zimmt, Kaneel, G.; *Canelle,* F.; *Canela,* Sp.; *Kanel,* Sw.

Origin.—*Cinnamomum zeylanicum,* Breyne, and other species of *Cinnamomum* (*Lauraceæ*).

Habitat.—Ceylon and China.

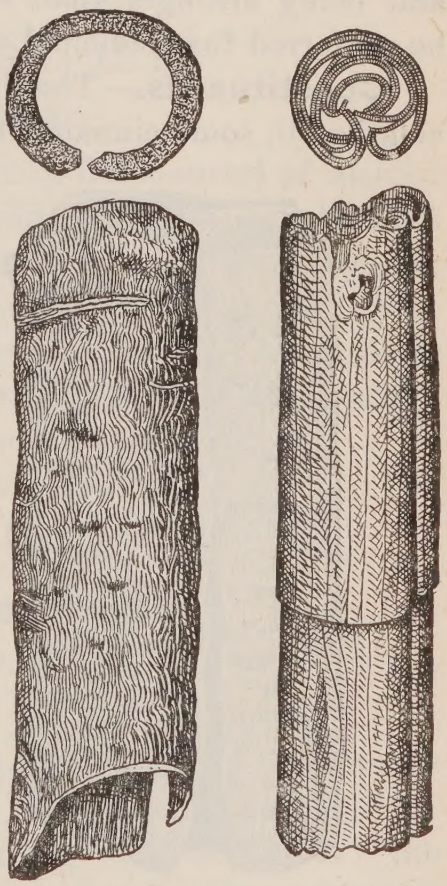
Part used.—The inner bark from the shoots.

Description.—See the Pharmacopœia, page 82.

The Pharmacopœia permits the use of either Ceylon cinnamon or Chinese cinnamon (Cassia cinnamon, Cassia lignea), or both indiscriminately.

Ceylon cinnamon comes in long quills consisting of several pieces rolled together; each quill has eight or more layers of a bark not much thicker than ordinary brown manilla paper. It has a light yellowish-brown color. Outer surface smooth.

Chinese cinnamon consists of single quills, not several inserted one within the other as in Ceylon cinnamon. Quills irregular in form. Outside somewhat rough. Bark thicker and of variable thickness. Brown.



FIGS. 162-165.—Chinese and Ceylon Cinnamon, whole and transverse sections, natural size.

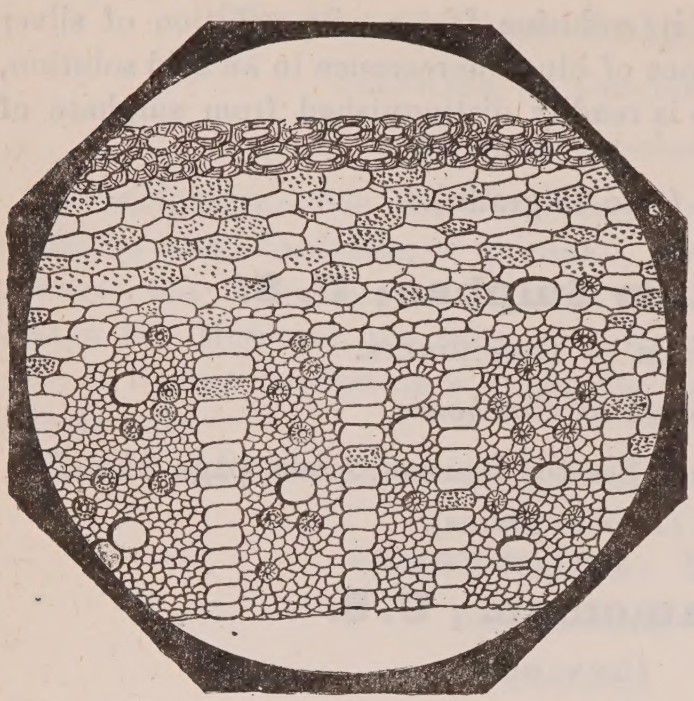


FIG. 166.—Ceylon Cinnamon, transverse section, enlarged.

Both kinds of cinnamon have a pleasant fragrant odor, and a warm, aromatic, sweetish taste.

Ceylon cinnamon is stronger as well as finer in aroma than the Chinese.

Saigon cinnamon is a variety of Chinese cinnamon which is now obtainable in the market. It is in very large regular quills, often over three-fourths of an inch in diameter, very rough in appearance, but possessing a strong and fine flavor. It is of fine quality, and being stronger than either Ceylon or Chinese cinnamon ought to be preferred for medicinal uses.

Constituents.—The drug contains from one-half to one per cent. volatile oil, some cinnamic acid, sugar, etc. (See Oleum Cinnamomi.)

FIGS. 167-171.—Saigon Cinnamon, large and small quills, natural size. *a*, transverse section of large quill; *b*, transverse section of small quill, both natural size; *c*, lichen on bark (*Graphis elegans*), enlarged.

Medicinal Uses.—Cinnamon is a warm, agreeable, aromatic and stimulant, much used as a flavoring excipient. It enjoyed the reputa-

tion of controlling *uterine hemorrhages*, and, was formerly much, and is even now occasionally, employed for this purpose. It is generally combined with other remedies, as sulphuric acid, etc. We do not believe that it possesses any power to check such hemorrhages, but that the effect must be ascribed to the other ingredients of the combinations. It is most frequently employed as a spice in culinary preparations.

Dose.—One to two grams (15 to 30 grains) or more.

CINNAMOMI AQUA SPIRITUOSA.

SPIRITUOUS CINNAMON WATER.

Put two hundred grams (7 ounces 24 grains) cinnamon, in coarse powder, two hundred cubic centimeters (6¾ fluidounces) diluted alcohol, and two liters (68 fluidounces) water, into a pharmaceutical still, and distil off one liter (34 fluidounces). In the distillate dissolve twenty grams (308 grains) sugar.

This preparation is not clear when just made, but becomes so upon standing.

CINNAMOMI TINCTURA; U. S.

TINCTURE OF CINNAMON.

Mix six hundred grams (measuring about 26 fluidounces) of alcohol with four hundred cubic centimeters (13½ fluidounces) water. Moisten one hundred grams (3 ounces 230 grains) cinnamon, in No. 40 powder, with fifty grams (measuring about two fluidounces) of the mixture; pack it into a percolator, and percolate with the remainder of the menstruum, and as much more, mixed in the same proportions, as may be necessary to obtain one thousand grams (or 37 fluidounces) of tincture.

[The menstruum should be undiluted alcohol.]

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

Cinnamomi Oleum; U. S.

OIL OF CINNAMON.

Cinnamomi Ætheroleum—Volatile Oil of Cinnamon.

Description.—See the Pharmacopœia, page 235. The Pharmacopœia allows the use of either "Oil of Cassia" or "Oil of Ceylon Cinnamon." This is, of course, equivalent to making "Oil of Cassia" the official oil of cinnamon, as the price of that is only about one-thirtieth to one-twentieth part of the price of the oil of Ceylon cinnamon.

The specific gravity of oil of Ceylon cinnamon is about 1.040; that of oil of Chinese cinnamon (Cassia) is about 1.060.

Used for flavoring.

CINNAMOMI AQUA; U. S.

CINNAMON WATER.

One gram (15 grains) volatile oil of cinnamon, and two grams (30 grains) cotton are required to make five hundred cubic centimeters (17 fluidounces) of cinnamon water. (See Aquæ Aromaticæ, page 166.)

Cinnamon water is a stimulant aromatic and carminative vehicle for other remedies in *colic diarrhœa.*

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

CINNAMOMI ELÆOSACCHARUM.

Triturate ten centigrams (2 drops) volatile oil of cinnamon with five grams (77 grains) powdered sugar.

CINNAMOMI SPIRITUS; U. S.

Mix thirty grams (1 fluidounce) oil of cinnamon and two hundred and seventy grams (measuring about 11 fluidounces) alcohol.

Used as a carminative in doses of one to two cubic centimeters (15 to 30 minims).

CINNAMOMI SYRUPUS.

SYRUP OF CINNAMON.

Dissolve six hundred and fifty grams (22 ounces 400 grains) sugar in three hundred and sixty cubic centimeters (12 fluidounces) cinnamon water.

Used for flavoring.

Cinnamomi Fructus Immatura.

CASSIA BUDS.

Cassiæ Flores.

The unripe fruits of the Chinese cinnamon tree. In appearance they resemble cloves somewhat, but are smaller, drier, and of a lighter grayish-brown color. The odor and taste resemble those of cinnamon, but are much weaker and perhaps less agreeable.

Civetta.

CIVET.

Zibetha.

Origin.—An unctuous secretion taken from a sac between the rectum and genitals of *Viverra zibetha* and *V. civetta*, Schreb.

Description.—Yellowish-brown, or brown, fusible, insoluble in water, soluble in hot absolute alcohol, only partially soluble in ether, has a strong musky odor, and a bitter nauseous taste.

Constituents.—It contains fixed and volatile oil, resin, etc.

Imported in horns.

Used for perfumery.

Cocculus Indicus.

COCCULUS INDICUS.

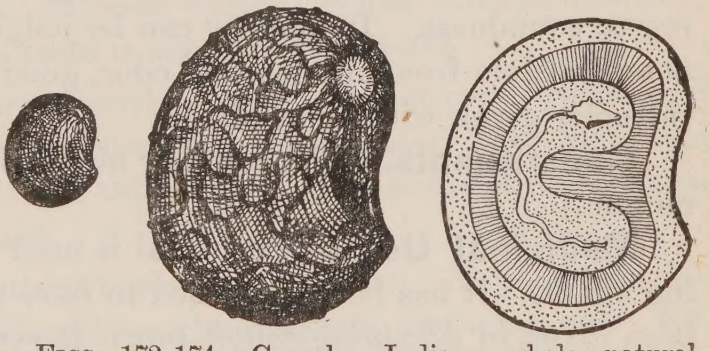
Cocculi Fructus—Kokkelskörner, Fischkörner, G.; *Coque du Levant*, F.; *Kockelkärnor*, Sw.; *Fish-berries.*

Origin.—*Anamirta Cocculus*, Wight and Arn (*Menispermaceæ*).

Habitat.—The East Indies.

Part used.—The fruit.

Description.—Blackish-brown, wrinkled, brittle, inodorous, and nearly tasteless, except the shrivelled embryo, which is bitter. Form, size, and structure are seen in the illustration.



FIGS. 172–174.—Cocculus Indicus, whole, natural size; whole, enlarged; and longitudinal section, enlarged.

Constituents. — The kernel contains a neutral principle called *picrotoxin* (or *picrotoxic acid*), which is poisonous. It crystallizes in needles, and is soluble in hot alcohol, but only slightly soluble in cold water or alcohol. (See Picrotoxinum.)

The shell contains the alkaloids *menispermine* and *paramenispermine*, combined with *hypopicrotoxic acid.*

The drug also contains a considerable quantity of fixed oil.

Medicinal Uses.—Cocculus indicus is seldom administered internally. It is said to have produced valuable results in *chorea*, *epilepsy*, and some forms of *paralysis.* It is more frequently employed externally in the form of decoction or ointment to kill *lice* and to cure *ringworm* of the scalp.

Dose.—0.05 to 0.1 gram (1 to 2 grains). Best given in the form of fluid extract.

Coccus; U. S.

COCHINEAL.

Coccionella—Cochenille, G. and F.; *Cochinilla, Grana*, Sp.; *Konsionell*, Sw.

Origin.—The female of *Coccus cacti*, Linné (*Hemiptera*).

Habitat.—Mexico and Central America. The insects feed on several species of opuntia and other cactus plants.

Description.—See the Pharmacopœia, page 82. The females are wingless, bluish-red, and less than one-tenth of an inch long before fecundity, but twice that size after impregnated, when they are killed with hot water, and then dried.

FIGS. 175, 176.—Cochineal. *a*, dry, as in drug, natural size; *b*, soaked in water, natural size.

The shape of the insect and the different organs can be seen after putting the dried coccus into water and allowing it to swell and assume its natural form and proportions.

Cochineal varies in color, according to the process of drying, from grayish-white to reddish-black. In the market we find the *silver-gray* and the *black*, both of which may be good, bad, or indifferent, according to soundness. Its quality can be judged of by its clearness, plumpness, freedom from any marked odor, good weight, and the intensity of the color given with ammonia.

Constituents.—The coloring matter is *carminic acid.* (See Carminum.)

Medicinal Uses.—Cochineal is used almost altogether as a coloring agent. It has been supposed to have antispasmodic effects, and has been given in *whooping-cough*, but it is very doubtful whether any good effects are obtained from its use in that disease.

Dose.—0.03 to 0.2 gram ($\frac{1}{2}$ to 3 grains).

COCCI PULVIS COMPOSITUS.

COMPOUND POWDER OF COCHINEAL.

Mix thirty grams (1 ounce) powdered cochineal, thirty grams (1 ounce) powdered alum, thirty grams (1 ounce) potassium carbonate, and sixty grams (2 ounces) potassium bitartrate.

COCCI TINCTURA.

TINCTURE OF COCHINEAL.

Percolate sixty grams (2 ounces) powdered cochineal with enough diluted alcohol to obtain three hundred cubic centimeters (10 fluid-ounces) tincture.

COCCI TINCTURA COMPOSITA.

COMPOUND TINCTURE OF COCHINEAL.

Macerate one hundred and twenty grams (4 ounces) compound powder of cochineal during twelve hours in a warm place with one thousand cubic centimeters (34 fluidounces) diluted alcohol. Filter.

Used for coloring various liquids.

Cochlearia.

COCHLEARIA.

Cochleariæ Herba—Löffelkraut, G.; *Herbe au Scorbut*, F.; *Coclearia*, Sp.; *Skörbjuggsört, Skedört*, Sw.; *Scurvy Grass.*

Origin.—*Cochlearia officinalis*, Linné (*Cruciferæ*).

Habitat.—Europe.

Part used.—The whole herb in the fresh state.

Description.—The root leaves have long petioles, and are rounded or broadly heart-shaped, obtuse, toothed; the stem leaves are spirally arranged, sessile (the upper ones clasping), ovate, sagittate, or heart-shaped, fleshy, bright green. Flowers white. When bruised the herb emits a pungent odor. The taste is saline, bitter, acrid.

Constituents.—From one-fourth to one-half per cent. volatile oil is obtained by distillation after macerating the bruised herb with cold water, by which the formation of this volatile oil is induced. It resembles the volatile oil of mustard.

Medicinal Uses.—Antiscorbutic and diuretic. A good remedy in *scurvy, bleeding gums, hemorrhages* from mouth and nose, etc. Externally the fresh herb, bruised, is used as an application to *scrofulous* and *indolent ulcers.*

The juice, or a saturated tincture, has been used as a valuable ingredient of gargles and mouth-washes in scurvy, etc.

Dose.—It may be eaten as a salad, fifty to one hundred grams (1½ to 3 ounces) during the day, or the expressed juice may be taken in tablespoonful doses several times daily.

COCHLEARIÆ SPIRITUS.

SPIRIT OF COCHLEARIA.

Macerate two thousand grams (70 ounces 240 grains) fresh, bruised cochlearia in a closed vessel with one thousand cubic centimeters (34 fluidounces) water for twenty-four hours; then add one thousand one

hundred cubic centimeters (37⅓ fluidounces) diluted alcohol, introduce the whole in a still and distil off one thousand cubic centimeters (34 fluidounces).

COCHLEARIÆ SPIRITUS COMPOSITUS.

COMPOUND SPIRIT OF COCHLEARIA.

Alcoolate of Cochlearia.

Beat together until well mixed one thousand grams (35 ounces 120 grains) fresh, bruised cochlearia and one hundred and thirty grams (4 ounces 256 grains) fresh grated horseradish ; add one hundred and eighty cubic centimeters (6 fluidounces) water ; let stand in a closed vessel twenty-four hours ; then add one thousand cubic centimeters (34 fluidounces) alcohol ; introduce the whole into a still and distil off one liter (34 fluidounces).

Codeina ; U. S.

CODEINE.

Codeia.

An alkaloid from opium. Large, colorless, or slightly yellowish crystals. For further properties see the Pharmacopœia, page 82.

Medicinal Uses.—Its effects are similar to those of morphine in producing sleep, but codeine is weaker and not followed by the disagreeable after-effects of morphine.

Dose.—0.015 to 0.06 gram (¼ to 1 grain).

CODEINÆ SYRUPUS.

SYRUP OF CODEINE.

Triturate 0.50 gram (7½ grains) codeine with thirty cubic centimeters (1 fluidounce) water ; heat until the codeine is dissolved ; then add two hundred and forty cubic centimeters (8 fluidounces) simple syrup.

Dose.—One to two teaspoonfuls.

Colchici Radix ; U. S.

COLCHICUM ROOT.

Colchici Cormus—Zeitlosenknollen, G.; *Bulbe de colchique, Bulbe de safran bâtard*, F.; *Colquico*, Sp.; *Tidlöserot, Colchicumrot*, Sw.

Origin.—*Colchicum autumnale*, Linné (*Melanthaceæ*).

Habitat.—Europe.

Part used.—The corm.

Description.—See the Pharmacopœia, page 83. Must be inodorous, sound, and have a bitter, acrid after-taste. A colchicum root which is dark colored or horny is unfit for use.

Colchicum root is less active than colchicum seed. (See Colchici Semen.)

FIGS. 177–185.—Colchicum, in transverse and longitudinal sections, natural size, as it occurs in the drug.

Constituents.—The only active constituent is the powerful and poisonous alkaloid *colchicine*, of which the root contains less than one-tenth per cent.

Colchicine is amorphous, white or yellowish, has a saffron-like odor and a bitter taste. It is soluble in water and in alcohol.

Medicinal Uses.—The preparations of the corm or seeds may be used indiscriminately, due allowance being made for difference in strength. Colchicum in medicinal doses produces an increased secretion from the bowels and kidney, and probably from the liver. In large doses it causes vomiting and purging. It is used in *gout*, in which disease it is of great value. It should be given in doses sufficiently large to produce diaphoresis, increased action of the bowels and kidneys, but not purging or vomiting. It is also useful in *rheumatic gout*, *chronic rheumatism*, and *uræmic poisoning*.

Dose of the powdered corm, 0.10 to 0.50 gram (2 to 8 grains) every four to six hours; of the powdered seeds, 0.05 to 0.35 gram (1 to 5 grains).

Poisonous Effects and Antidotes.—In excessive doses colchicum produces gastro-intestinal irritation, watery stools, pain in the bowels, and collapse which may be followed by death. It is an irritant poison, the evil effects of which must be counteracted by prompt administration of emetics and purgatives, followed by opium and alcoholic stimulants.

COLCHICI EXTRACTUM; B.

Fresh colchicum root is peeled and bruised, after which the juice is expressed, allowed to settle, heated to 100° C. (212° F.), strained through flannel, and then evaporated on a water-bath at a temperature not exceeding 71° C. (160° F.) to the consistence of extract.

Brown.

Dose.—0.03 to 0.15 gram ($\frac{1}{2}$ to $2\frac{1}{4}$ grains).

COLCHICI RADICIS EXTRACTUM; U. S.

Extract of Colchicum.

Take five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of colchicum root in No. 60 powder. As a menstruum use, first, a mixture of one hundred and seventy-five grams (6 ounces 75 grains) acetic acid, and seven hundred and fifty grams ($25\frac{1}{2}$ fluidounces) water; this mixture, when all used, to be followed by water. Moisten with two hundred and fifty grams (about $8\frac{1}{2}$ fluidounces) of the acetic acid mixture. Pack it moderately in a cylindrical percolator made of glass. Saturate with menstruum. Macerate twenty-four hours. Then percolate to exhaustion. Evaporate the percolate in a porcelain dish on a water-bath at not above 80° C. (176° F.) to solid extract.

Brown. Has an acetous odor.

Dose.—0.03 to 0.10 gram ($\frac{1}{2}$ to $1\frac{1}{2}$ grain).

COLCHICI RADICIS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Colchicum Root.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 7 fluidounces) of the menstruum. Pack it moderately in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters ($14\frac{1}{3}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then

dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.10 to 0.50 cubic centimeter (2 to 8 minims).

COLCHICI RADICIS TINCTURA.

TINCTURE OF COLCHICUM ROOT.

Moisten ninety grams (3 ounces) colchicum root, in No. 30 powder, with forty-five cubic centimeters (1½ fluidounce) diluted alcohol. Macerate twenty-four hours. Pack it tightly in a cylindrical percolator, and percolate with diluted alcohol until three hundred cubic centimeters (10 fluidounces) tincture has been obtained.

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims).

COLCHICI RADICIS VINUM; U. S.

WINE OF COLCHICUM ROOT.

Moisten one hundred and twenty grams (4 ounces 100 grains) colchicum root, in No. 30 powder, with thirty grams (1 ounce 25 grains, or about 1⅛ fluidounce) of stronger white wine. (See page 1022.) Pack it moderately firmly in a conical percolator, and percolate with stronger white wine until three hundred grams (10 ounces 255 grains, or about 10 fluidounces) percolate has been obtained.

Dose.—0.3 to 1.3 cubic centimeters (5 to 20 minims).

Colchici Semen; U. S.

COLCHICUM SEED.

Zeitlosensamen, G.; *Semences de Colchique*, F.

Origin.—*Colchicum antumnale*, Linné (*Melanthaceæ*).

Habitat.—Europe.

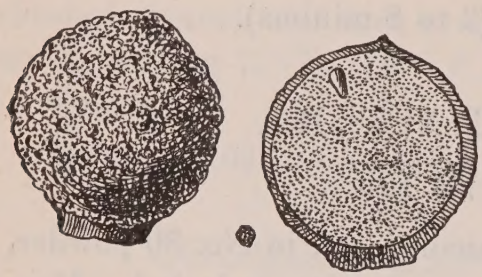
Part used.—The fully ripe seeds.

Description.—See the Pharmacopœia, page 83. About the size of white mustard seed. Shrunken seeds—collected and dried before fully ripe—should be rejected.

Colchicum seeds are extremely tough, and can be powdered only with great difficulty.

When made from properly powdered drug the preparations of colchicum seed are about double the strength of corresponding preparations

made from the root, using the same amount of drug in proportion to the menstruum. Thus fluid extract of colchicum seed should be, with proper management in its preparation, about twice the therapeutic strength of the fluid extract of colchicum root. Although diluted alcohol extracts more or less of the medicinal virtues from even unbroken colchicum seeds by the aid of heat, the exhaustion of the drug cannot be perfectly accomplished unless the seeds are properly ground.



FIGS. 186–188.—Colchicum Seed, natural size and enlarged, and longitudinal section, enlarged.

Constituents.—The dried seeds contain from one-fifth to one-third per cent. *colchicine* (see under title "Colchici Radix"). They also contain from six to eight per cent. fixed oil.

Medicinal Properties and Uses.—See under title "Colchici Radix."

Dose.—From 0.05 to 0.35 gram (1 to 5 grains), best given in the form of fluid extract.

COLCHICI SEMINIS EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF COLCHICUM SEED.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.10 to 0.35 cubic centimeter (2 to 5 minims).

COLCHICI [SEMINIS] TINCTURA; U. S.

TINCTURE OF COLCHICUM [SEED].

Moisten forty-five grams (1 ounce 257 grains) colchicum seed, in No. 30 powder, with forty-five grams (about 1½ fluidounce) diluted alcohol; macerate twenty-four hours; pack moderately in a cylindrical percolator and percolate with diluted alcohol until three hundred grams (10 ounces 255 grains, measuring about 10½ fluidounces) tincture has been obtained.

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims).

COLCHICI SEMINIS VINUM; U. S.

WINE OF COLCHICUM SEED.

To forty-five grams (1 ounce 257 grains) colchicum seed, in No. 20 powder, with two hundred and seventy grams (about 9½ fluidounces) stronger white wine, and macerate seven days, shaking it occasionally; then filter through paper, adding, through the filter, enough stronger white wine (see p. 1022) to make the filtered liquid weigh three hundred grams (10 ounces 255 grains, measuring about 10 fluidounces).

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims).

Colchici Flores.

COLCHICUM FLOWERS.

Origin.—*Colchicum autumnale*, Linné (*Melanthaceæ*).

Habitat.—Europe.

Description.—They resemble crocus flowers, are six-parted, with a lilac or rose-colored border, and a whitish tube six inches or more long.

Constituents.—When carefully dried the colchicum flowers contain a large amount of *colchicine*, over one-third per cent. having been found in one specimen, which is more than three times as much as the root contains, and a little over the maximum amount found in the seeds (Nat. Disp.).

Colchicum flowers would undoubtedly be more convenient to prepare extracts, etc., from than the seeds, which are so extremely tough that they can be powdered only with great difficulty, and are liable to be of widely differing degrees of fineness, which results in corresponding differences in strength of the preparations prepared from different lots.

The flowers, however, are necessarily dear.

COLCHICI FLORUM TINCTURA.

TINCTURE OF COLCHICUM FLOWERS.

Digest one thousand grams (35 ounces 120 grains) fresh colchicum flowers with five hundred grams (17⅔ ounces, measuring about 20 fluid-ounces) diluted alcohol for seven days. Express and filter.

Dose.—0.50 to 2 cubic centimeters (8 to 30 minims).

Collinsonia.

COLLINSONIA.

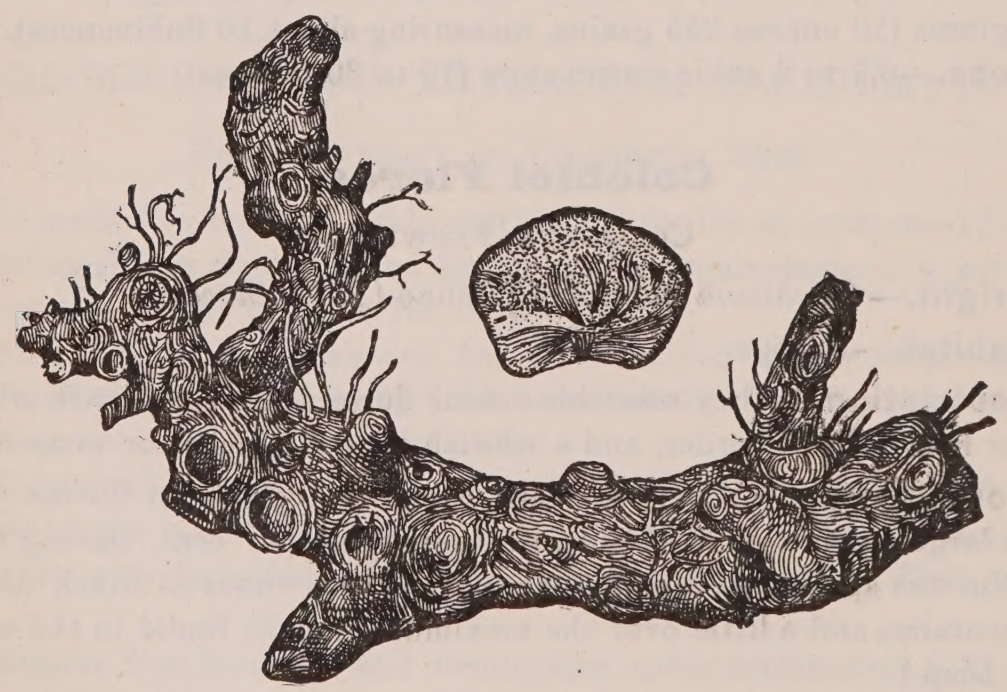
Collinsoniæ Radix—Stone-Root, Horsebalm, Richweed, Knobroot, Heal-all.

Origin.—*Collinsonia canadensis*, Linné (*Labiatæ*).

Habitat.—North America, north of South Carolina.

Part used.—The root.

Description.—A knotty, tubercular, branched rhizome, grayish-brown, about seven to ten centimeters (3 to 4 inches) long, marked by



FIGS. 189, 190.—Collinsonia. Whole and transverse section, natural size.

shallow stem-scars, and with thin rootlets, or remnants of rootlets. Bark, thin. Wood extremely hard and tough. Odor, none. Taste, disagreeable, nauseous.

Constituents.—No analysis.

Medicinal Uses.—It is a stimulant, having special effect upon the

mucous membrane of the bladder, and is useful in *vesical catarrh, calculous deposits* in the bladder, and in *dropsy*.

It is also said to be expectorant and stimulant in *chronic pulmonary diseases*.

Dose.—0.5 to 2 grams (8 to 30 grains), best given in the form of fluid extract.

COLLINSONIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF COLLINSONIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims).

Collodium ; U. S.

COLLODION.

Prepared by dissolving sixty grams (926 grains) soluble gun-cotton in one thousand and fifty grams (35 ounces, or about 49 fluidounces) stronger ether, and three hundred and ninety grams (13 ounces, or about 16½ fluidounces) alcohol.

The pyroxylin is first put into a tared bottle capable of holding half as much again as the total quantity of collodion to be made. Then the alcohol is added so as to wet all of the gun-cotton with it. After fifteen minutes the ether is poured in and the whole shaken until the gun-cotton is all dissolved. The bottle is then corked, or tied over with a wetted piece of hog's bladder, and set aside in a cool place to allow the collodion to become clear. When the sediment has settled perfectly, the clear collodion is poured off and at once put in small bottles, to be only about two-thirds full, which must be tightly corked, the corks being capped with bladder.

The collodion official in the German, Swedish, and several other Pharmacopœias is much stronger, *i.e.*, contains more gun-cotton.

Collodion is very inflammable, and must be kept away from any flame. It must also be kept in a cool place on account of the liability to expansion by heat sufficient to burst the bottle. Must be clear, and leave a transparent cohesive film on the skin when applied and allowed to evaporate In drying collodion contracts, sometimes painfully ; to

remedy this castor-oil, glycerin, etc., have been added with successful results. (See Collodium Elasticum and Collodium Flexile.) The contraction is greater the thicker the collodion is. It is, therefore, best to have it as thin as practicable. This is the case with the preparation of the U. S. Pharmacopœia, which has just sufficient body to insure a continuous elastic film over the surface upon which it is applied.

Medicinal Uses.—Collodion is used to protect *wounds* and *abrasions* from the air, thus facilitating healing by first intention.

When wounds are held in apposition by isinglass plaster and collodion, instead of stitches, the resulting scar will be less unsightly.

It is also locally astringent, for as the film contracts it mechanically presses the blood from the vessels, and on account of this action it is often used to abort *inflammation* and *forming abscesses.* It is also a useful application in *fissure of the nipple.*

COLLODIUM ELASTICUM.

ELASTIC COLLODION.

This is simply official collodion with one-half per cent. glycerin added—say five grams (1¼ drachm) glycerin to one thousand grams (35 ounces) of collodium. Being very plastic this is not as painful as pure collodion.

COLLODIUM FLEXILE; U. S.

FLEXIBLE COLLODION.

Mix thirty grams (1 ounce) castor-oil, fifty grams (1⅔ ounce) Canada turpentine, and nine hundred and twenty grams (30⅔ ounces) of collodion, all by weight. Keep it in tightly corked bottles, capped, only two-thirds filled, and put away in a cool place, remote from any flame.

Nearly identical with the preparation of the Pharmacopœia of 1870.

Colocynthis; U. S.

COLOCYNTH.

Colocynthidis Fructus—Koloquinten, G.; *Coloquinte*, F.; *Coloquintida*, Sp.; *Koloqvint*, Sw.; *Bitter Apple.*

Origin.—*Citrullus Colocynthis*, Schrader (*Cucurbitaceæ*).

Habitat.—Spain, Western Asia, etc.

Part used.—The pulp of the fruit, after the separation of the seeds.

Description.—See the Pharmacopœia, page 85. Usually about the size of a small orange.

The Pharmacopœia directs that the whole fruit be obtained, although

the pulp only is to be used, because it is easier to judge of the quality of the drug in that condition. Were it deprived of its seeds it would necessarily be crumbled almost to powder. The seeds are medicinally almost inert. They constitute about three-fourths of the whole dried fruit, and are to be removed before weighing out the drug for use in making preparations.

Colocynth is liable to absorb moisture, and unless kept in a dry place will become mouldy. Discolored colocynth, as well as a drug with hard pulp, is unfit for use.

Spanish colocynth is the most common kind in our country, and is usually of very fair quality. Turkish or Levantic colocynth is the best, but is difficult to obtain.

Constituents.—A yellow, either amorphous or crystalline, bitter principle, called *colocynthin*, which is soluble in water and alcohol, and is very bitter. Also resin, etc.

Medicinal Uses.—In small doses it is almost a simple bitter, improving appetite and digestion, and increasing the secretions from the intestines slightly. In larger doses it is a powerful drastic and hydragogue cathartic, useful in *constipation* or *dropsies* to remove large fecal or dropsical accumulations. In overdoses colocynth produces violent purging, griping, and gastro-intestinal irritation. It is generally given in combination with other drugs—rhubarb, scammony, or aloes—and on account of its intensely bitter taste is preferably given in pills.

Dose.—As a laxative, 0.10 to 0.30 gram (2 to 5 grains), and as a purgative, 0.30 to 0.60 gram (5 to 10 grains).

COLOCYNTHIDIS EXTRACTUM; U. S.

Extract of Colocynth.

Remove all the seeds from two thousand grams (70 ounces 240 grains) colocynth, which must be quite dry. Reduce the pulp to coarse powder and macerate it with five thousand grams (about 12 pints) of diluted alcohol for four days, stirring occasionally. Press out all the liquor, and strain it through flannel. Pack the residue tightly into a cylindrical percolator, cover it with the straining cloth used, and percolate with diluted alcohol until the percolate obtained, together with the macerate, weighs ten thousand grams (or measure 22 pints). Recover the alcohol by distillation in the usual way, discontinuing the process when six thousand grams (measuring about 16 pints) has been collected in the receiver. Evaporate the residue by water-bath heat to dryness and powder it.

The yield is from ten to twenty per cent. Extract of colocynth has a rich brown color. It absorbs moisture from the air and should therefore be kept in tightly closed bottles.

The colocynth seeds are not only medicinally inert, but if allowed to remain with the pulp in preparing the extract would spoil the product by leaving it contaminated with fixed oil.

Dose.—0.05 to 0.10 gram (1 to 1½ grain).

COLOCYNTHIDIS EXTRACTUM COMPOSITUM; U. S.

Compound Extract of Colocynth.

Melt one hundred grams (3 ounces 230½ grains) socotrine aloes on a water-bath ; add twenty grams (6⅔ fluidrachms) alcohol, stir well, and then strain the mixture through a No. 60 sieve which has been made wet and hot by dipping it into boiling water. Add to the strained aloes thirty-two grams (1 ounce 56½ grains) extract of colocynth, twenty-eight grams (432 grains) resin of scammony, and twenty-eight grams (432 grains) white Castile soap, and heat the whole mixture at a temperature not above 135° C. (275° F.) until it becomes perfectly smooth and uniform, and a sample of it gets brittle on cooling. Now take the mixture off the source of heat, incorporate thoroughly with it twelve grams (185 grains) cardamom, in No. 60 powder, and cover the whole well until cold. Then reduce the product to fine powder.

Must be kept in tightly closed bottles.

Good compound extract of colocynth has a rich dark-brown color and an agreeable aromatic odor.

A valuable purgative in *chronic* and *obstinate constipation.* In small doses it generally produces one or two pulpy stools. This preparation is often combined with extract of hyoscyamus or of belladonna to prevent griping and to increase its action.

Dose.—0.25 to 0.5 gram (4 to 8 grains).

COLOCYNTHIDIS EXTRACTUM FLUIDUM.

Fluid Extract of Colocynth.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the pulp, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—0.25 to 0.5 cubic centimeter (4 to 8 minims).

COLOCYNTHIDIS TINCTURA.

TINCTURE OF COLOCYNTH.

Percolate diluted alcohol through sixty grams (2 ounces) coarsely powdered colocynth, packed in a conical percolator, until three hundred cubic centimeters (10 fluidounces) tincture has been obtained.

Used simply as a bitter stomachic in doses of 0.2 to 0.5 gram (3 to 8 minims).

Confectiones.

CONFECTIONS.

Conserven, Latwergen, G.; *Electuaires, Saccharolés mous, Conserves*, F.; *Moser*, Sw.; *Electuaries, Conserves.*

Prepared by incorporating moist medicinal substances with sugar, or by mixing dry powders with honey or syrup, the object being not only to render the preparations comparatively palatable, but also to preserve the active constituents from change, which in properly prepared confections is certainly effected. Soft electuaries, however, do not keep well, and are intended to be always prepared extemporaneously when wanted for use. This class of preparations is almost obsolete. Those enumerated in this work perhaps constitute the greater number of all that are now used, and none of them is extensively employed, even the formerly popular confection of rose and the confection of senna being largely supplanted by other preparations.

A distinction is sometimes made between *conserves* and *electuaries*, the first being made by incorporating moist drugs with dry sugar, while the latter are prepared by incorporating dry powdered drugs with moist saccharine substances, as honey or syrup.

Conium; U. S.

CONIUM.

Conii Fructus, Conii Semen—Schierlingsfrucht, G.; *Fruits de Ciguë*, F.; *Cicuta*, Sp.; *Odörtfrukt*, Sw.; *Conium Seed, Conium Fruit, Hemlock Fruit.*

Origin.—*Conium maculatum*, Linné (*Umbelliferæ*).

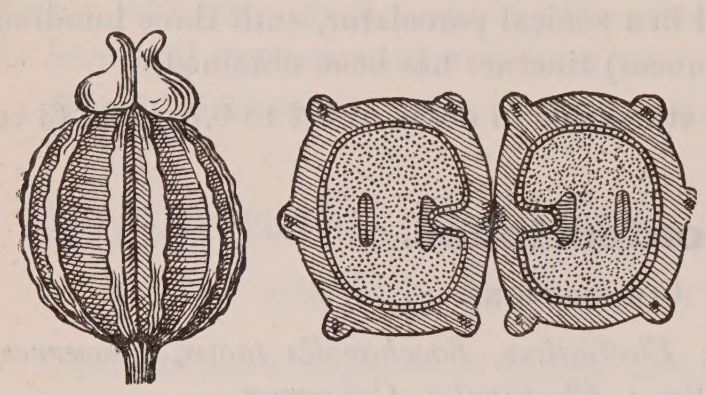
Habitat.—Europe, North America.

Part used.—The full-grown fruit, gathered while it is yet green.

Description.—See the Pharmacopœia, page 86. Conium fruit is rather smaller than anise.

Constituents.—The constituents of conium are three alkaloids, a

little volatile oil, and also some fixed oil. *Coniine* is the most important alkaloid, and has the properties of the drug. It is a colorless, oily liquid, having a strongly alkaline reaction. Its odor resembles that of the urine of rats, and the taste is acrid, tobacco-like. Readily soluble in alcohol; only slightly soluble in water. It is very volatile, and rapidly changes and decomposes when exposed to the air or to heat. In the nearly ripe fruit of the plant in the second year the alkaloid has been found to the extent of four-fifths per cent. *Methyl-coniine*, another alkaloid, in the constitution of which one hydrogen atom of the coniine is replaced by methyl, is found in the commercial coniine, and probably exists in the drug. The third alkaloid is *conhydrine*, which is crystallizable, convertible into coniine by abstracting the elements of one molecule of water. It is medicinally active, but less poisonous than coniine.



FIGS. 191, 192.—Conium Fruit, whole and transverse section, both enlarged.

The volatile oil is not poisonous.

Nomenclature.—Conium leaves being still in use, we consider it unfortunate that the fruit should be called "Conium" instead of "Conii Fructus."

Medicinal Uses.—Conium is a remedy of much value to restrain excessive motor excitement or muscular agitation. It is much employed in the treatment of the insane, especially those suffering from *acute mania* without organic brain trouble. It is also administered with good effect in *chorea*, *whooping-cough*, *asthma*, etc.

Like almost all other remedies that exert any influence on the nervous system, conium has also been given in *epilepsy*, but not with as good success as can be obtained by the use of the bromides.

Conium is very useful in *erotic insanity* and in the mental and nervous disorders resulting from masturbation.

Conium also has been much used as a discutient in *cancerous tumors*, being used internally and externally; also in cases of *scrofular swellings of glands* with equal success.

The leaves, mixed with linseed meal, and used as a poultice, form an excellent anodyne application to painful swellings.

Dose.—Of the leaves in powder, 0.2 to 0.5 gram (3 to 8 grains); of the fruit in powder, 0.03 to 0.25 gram ($\frac{1}{2}$ to 4 grains).

Caution.—Different specimens of conium vary much in strength, so that a new lot of any of its preparations must be given in minimum doses, gradually to be increased until the effects of the drug are produced. Want of care in this regard has often resulted in fatal poisoning from doses that were not larger than those of another lot of the same kind of preparation which had been previously employed.

Poisonous Effects.—Excessive doses of conium preparations produce gastric irritation, nausea, and vomiting. Disturbed vision, dulness of the mind, dizziness and numbness, and an inability to properly articulate words, indicate the effects of the drug on the motor nerves. If a fatal dose is taken, paralysis of the voluntary muscles, commencing with those of the legs, sets in, and as the paralysis affects the respiratory muscles, death from asphyxia results.

Physiologically nux vomica and its alkaloids are antidotes.

Active and enforced muscular exertion, as in opium-poisoning, is also the best treatment in conium-poisoning.

CONII ABSTRACTUM; U. S.

Abstract of Conium.

Two hundred grams (7 ounces 24 grains) of conium fruit, in No. 40 powder, is moistened uniformly with a mixture of six grams (92½ grains) of hydrochloric acid (of U. S. P. standard) and eighty grams (2 ounces 359 grains, or about 3⅛ fluidounces) of ninety-four per cent. alcohol. The moist powder is packed tightly in a tall cylindrical percolator. More alcohol is now added until the mass is saturated and the liquid begins to drop at the lower end of the percolator, while a layer of the alcohol still covers the upper surface of the drug. The exit of the percolator is now closed and the top covered to prevent evaporation. The whole is allowed to stand forty-eight hours. Then the percolation is started, adding alcohol as required to keep the drug always covered. When two hundred cubic centimeters (or about 7 fluidounces) of percolate has been obtained, set that portion aside. Place another receiver under the percolator and continue the process until the drug is exhausted. Evaporate this second percolate down until it weighs thirty grams (1 ounce). Mix this with the reserved portion. The mixed liquids (weighing two hundred grams (7 ounces), are put in a tared evaporating dish with sixty grams (2 ounces) powdered milk-sugar, and set in a place where the temperature is between 40° and 50° C., or from 104° to 122° F., until the mixture is dry. Then enough powdered sugar of milk is added to make the total weight of the contents of the dish one hundred

grams (3 ounces 230 grains). The whole is now triturated until a uniform and very fine powder is obtained.

The same product may be obtained by evaporating one thousand cubic centimeters (34 fluidounces) of the fluid extract of conium fruit with the requisite quantity of milk sugar, making five hundred grams (17⅔ avoirdupois ounces) finished product.

Dose.—About six to twenty centigrams (1 to 3 grains).

CONII [FRUCTUS] EXTRACTUM ALCOHOLICUM; U. S.

ALCOHOLIC EXTRACT OF CONIUM [FRUIT OR "SEED"].

Take five hundred grams (17⅔ avoirdupois ounces) of conium fruit in No. 30 powder. As a menstruum use diluted alcohol. Moisten with one hundred and fifty grams (5⅝ fluidounces). Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate. Reserve four hundred and fifty grams (about 15 fluidounces) of *first percolate.* Continue the percolation until the drug is exhausted or until one thousand and fifty grams (37 fluidounces) of *second percolate* has been obtained. Add fifteen grams (230 grains) hydrochloric acid to the second percolate and then evaporate it to a soft extract. Mix this with the *first percolate,* evaporate the mixture to a pilular consistence, and finally add five per cent. glycerin.

Practically the same product is obtained by evaporating the fluid extract of conium (fruit) to the pilular consistence and incorporating five per cent. glycerin with the solid extract remaining.

Dose.—0.02 to 0.06 gram (⅓ to 1 grain).

Nomenclature.—The "Alcoholic Extract of Conium" of the U. S. Pharmacopœia of 1870 was made from the leaves and without adding hydrochloric acid previous to evaporation. The conium fruit, as will be seen in the statement of the chemical constituents of conium leaves, is liable to be three times as strong as the latter. The addition of hydrochloric acid has for its object the conversion of the alkaloid as it exists naturally in the drug into a hydrochlorate which will better withstand the heat and exposure during the evaporation. We have, therefore, in the new alcoholic extract of conium a preparation that must be used in far smaller doses than required of the preparation which in the Pharmacopœia just superseded bore the same name. The fact that the fruit contains more of the alkaloids than the leaves is not the only factor which renders the two extracts different in strength, for the disparity is further increased by the fact that the yield of solid extract from fruits like the drug under consideration is much smaller than the yield from leaves.

CONII [FRUCTUS] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF CONIUM [FRUIT].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 5⅝ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Add fifteen grams (231½ grains) hydrochloric acid to the *second percolate.*

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.12 to 0.3 cubic centimeter (2 to 5 minims).

CONII [FRUCTUS] TINCTURA; U. S.

TINCTURE OF CONIUM [FRUIT].

Moisten forty-five grams (1 ounce 257 grains) conium fruit, in No. 30 powder, with a mixture of fifteen cubic centimeters (½ fluidounce) diluted alcohol and one hundred and twenty centigrams (18½ grains) diluted hydrochloric acid. Macerate twenty-four hours; pack moderately in a conical glass percolator, and percolate with diluted alcohol until three hundred grams (about 10 fluidounces) tincture has been obtained.

Dose.—One to four cubic centimeters (15 to 60 minims), increasing if necessary.

Conii Folia.

CONIUM LEAVES.

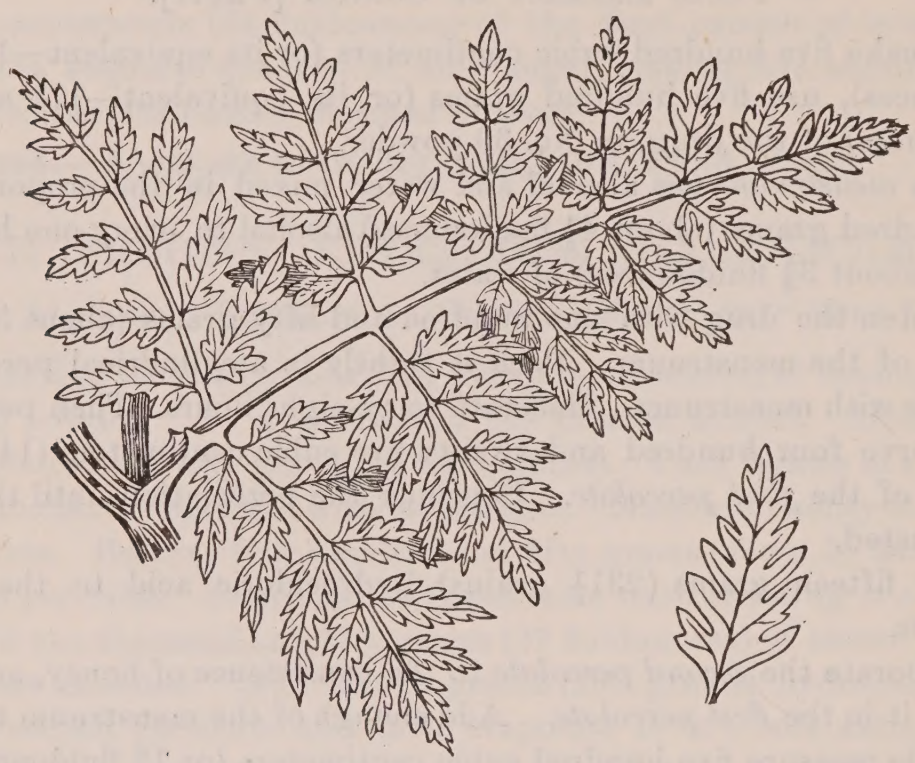
Schierlingsblätter, G.; *Feuilles de Cigué,* F.; *Cicuta,* Sp.; *Odörtsblad,* Sw.; *Hemlock Leaves.*

Origin.—*Conium maculatum,* Linné (*Umbelliferæ*).

Habitat.—Europe, North America.

Part used.—The leaves gathered from the plant in its second year.

Description.—They are dark green, smooth, oval in general outline, and pinnately decompound. When dried they are much wrinkled,



FIGS. 193, 194.—Leaf and leaflet of Conium. (Leaf reduced; leaflet natural size.)

have a pale, bluish-green color, a disagreeable, narcotic odor, and a sweetish, nauseating, acrid taste.

Constituents.—The conium leaves contain the same alkaloids as the conium fruit ("seeds"), but in extremely small proportions. Their use ought to be discontinued and the fruit only employed. The latter is at least three times as strong.

CONII CATAPLASMA; B.

HEMLOCK POULTICE.

Coarsely powdered hemlock leaf, sixty grams (2 ounces); flaxseed meal, one hundred and eighty grams (6 ounces); boiling water, six hundred cubic centimeters (20 fluidounces). Stir the mixed powders into the water.

Or half a fluidounce of fluid extract of hemlock may be added to eight or ten ounces of linseed poultice. This is a smaller proportion of the anodyne to the mass of the poultice, but is much more easily absorbed, so that it is, perhaps, even more active than the poultice prepared as above.

Used as a soothing application to painful swellings; it must be applied with caution to sores and ulcers.

CONII EMPLASTRUM.

CONIUM PLASTER.

Emplastrum Cicutæ—Hemlock Plaster.

Melt together two hundred and fifty grams (8 ounces 358 grains) lead plaster, fifty grams (1 ounce 334 grains) yellow wax, and ten grams (154 grains) resin; then, after letting the plaster mass cool somewhat, incorporate forty grams (1 ounce 180 grains) alcoholic extract of conium leaves, previously triturated with a little water so as to form a uniform smooth paste.

CONII EXTRACTUM; B.

EXTRACT OF CONIUM.

Fresh conium leaves are bruised in a stone mortar, a little water being sprinkled over the drug during the operation. The juice is expressed, heated to the boiling point, filtered, and then evaporated to extract, either in a vacuum apparatus by the aid of heat, or at the ordinary temperature in a shallow evaporating dish by means of a current of air directed over the surface of the liquid.

Unless prepared with extreme care the preparation is worthless. Owing to its uncertain strength, the alkaloid coniine being so volatile, this extract of conium is always dangerous to use.

Greenish brown. Yield about five per cent.

Dose.—About 0.10 to 0.25 gram (1½ to 4 grains).

Nomenclature—Caution.—This and the old alcoholic extract of conium ought not to be used. They are taken up in this book for the sake of completeness, and especially in order to point out the differences between the several extracts of conium. As conium is a potent and dangerous poison, it would be unsafe to ignore the recently abolished extracts before they have entirely passed out of use, especially as the new "Alcoholic Extract of Conium," having the same name as the one but yesterday dropped from the Pharmacopœia, is at least three times as strong and far more reliable and uniform, for if the old extract should be prescribed, basing the dose on the average strength of that preparation, the new extract should certainly not be dispensed. (See Extr. Aconiti Fol.)

CONII FOLIORUM EXTRACTUM ALCOHOLICUM.

ALCOHOLIC EXTRACT OF CONIUM LEAVES.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Greenish brown. Yield about twenty per cent.

Dose.—About 0.10 to 0.20 gram (1½ to 3 grains).

This preparation was official in the late Pharmacopœia of 1870 under the name of "Alcoholic Extract of Conium," this title being now given in the new Pharmacopœia to a much more powerful preparation made from the unripe fruit (so-called "Conium Seed," or "Hemlock Seed"). See "Conii Extractum Alcoholicum," under Conii Fructus.

CONII FOLIORUM EXTRACTUM FLUIDUM.

Fluid Extract of Conium Leaves.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—0.2 to 0.75 cubic centimeter (3 to 12 minims).

CONII OLEUM INFUSUM.

Infused Oil of Conium.

Beat one thousand grams (35 ounces 120 grains) fresh conium leaves into a pulp with a little cotton-seed oil. Then add two thousand grams (70 ounces 240 grains) cotton-seed oil, and heat the mixture on a water-bath until all the moisture has evaporated. Express and filter.

Used as an ingredient of anodyne liniments.

CONII SUCCUS.

Conium Juice.

Hemlock Juice.

Bruise a quantity of fresh conium leaves; express the juice; add to it one-third of its volume of rectified spirit. Let stand seven days, and then filter.

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm); a very unreliable preparation which ought not to be used.

CONII FOLIORUM TINCTURA (Phar. 1870).

Tincture of Conium Leaves.

Moisten thirty grams (1 ounce) conium leaves, in No. 30 powder, with thirty cubic centimeters (1 fluidounce) diluted alcohol; pack in a cylindrical percolator and percolate with diluted alcohol until two hundred and forty cubic centimeters (8 fluidounces) of tincture has been obtained.

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm).

CONII UNGUENTUM.

CONIUM OINTMENT.

Mix thirty grams (1 ounce) extract of conium, previously rubbed with a little water to a soft paste, with two hundred and ten grams (7 ounces) benzoinated lard.

Anodyne application for external use.

CONII VAPOR.

CONIUM INHALATION.

Mix one gram (15 grains) extract of conium, one gram (15 grains) solution of potassa, and ten grams ($\frac{1}{3}$ fluidounce) water. Put from one to two cubic centimeters (15 to 30 drops) of this mixture on a sponge, in an inhalation apparatus, so that the vapors from boiling water may pass over it and then be inhaled.

To allay cough and irritation of the larynx and bronchiæ in bronchitic affections, consumption, etc.

Convallaria Majalis.

CONVALLARIA.—LILY OF THE VALLEY.

Maiblumen, G.; *Muguet*, F.; *Liljekonvalj*, Sw.

Origin.—*Convallaria majalis*, Linné (*Liliaceæ*).

Habitat.—Europe, Northern Asia, and the United States, in the Southeastern States.

Part used.—The rhizome.

Description.—Whitish, branched, about the thickness of a quill.

Constituents.—*Convallamarin*, a bitter glucoside, which has been obtained in a white crystalline powder; and an acrid principle, *convallarin*, which crystallizes in rectangular prisms, and which foams in watery solution like saponin.

Medicinal Uses.—This drug exerts a powerfully stimulant action on the heart, and the fluid extract has been given internally or hypodermically injected, with benefit in *collapse*, *opium narcosis*, etc. It also possesses purgative properties resembling those of aloes. It has further been used in *intermittent fever* and *epilepsy*, and as a vermifuge.

Dose.—1 to 2.5 grams (15 to 40 grains), best given in the form of fluid extract.

CONVALLARIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CONVALLARIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims); for subcutaneous injection, 0.3 to 0.5 cubic centimeter (5 to 8 minims).

Copaiba; U. S.

COPAIBA.

Copaibæ Oleoresina, Oleo-resin of Copaiba; Balsamum Copaivæ—Copaivabalsam, G.; *Copahu, Baume ou Oléo-résine de copahu*, F.; *Balsamo de copaiba*, Sp.; *Kopaivabalsam*, Sw.; *Balsam of Copaiba.*

Origin.—*Copaifera Langsdorfii*, Desfontaines, and other species of *Copaifera* (*Leguminosæ*).

Habitat.—Brazil.

Description and Tests.—See the Pharmacopœia, page 86. It is not a "balsam" but an oleoresin.

Varieties.—*Para copaiba* (Maranham, Brazil, copaiba) is the best. It is pale in color and rich in volatile oil, containing about seventy to eighty-five per cent. Four fluidrachms of this copaiba will mix clear with 1½ fluidrachm water of ammonia, when shaken in a test-tube.

Maracaibo copaiba (Colombia copaiba) is thicker, darker, not always clear.

Constituents.—*Volatile oil*, and two resins which are dissolved in the oil. One of the resins is *copaivic acid.* This is crystallizable, of faint odor, bitter taste, insoluble in water, easily soluble in absolute alcohol; soluble also in ammonia, with which the oleo-resin (balsam) mixes clear if a sufficient quantity of the copaivic acid is present. Balsam of copaiba containing enough copaivic acid will solidify with magnesia (see Massa Copaibæ). Clear, thin-flowing Para copaiba, rich in volatile oil, has, however, been met with, which contains no copaivic acid.

Maracaibo copaiba contains *metacopaivic acid* instead of copaivic acid, does not mix clear with ammonia, and does not solidify with magnesia. It is also poor in volatile oil, containing little more than half as much as the Para copaiba.

The most active constituent is supposed to be the volatile oil. The copaivic acid, however, is also said to have great medicinal activity.

The more of volatile oil the copaiba contains, the lighter is its color, the lower its specific gravity, and the stronger its odor. When old, by the evaporation of volatile oil, the copaiba gets darker and thicker, and has a weaker odor.

Adulterations.—Copaiba may be, and undoubtedly in the past was, frequently adulterated with fixed oils, principally castor-oil, alcohol, turpentine, other oleo-resinous mixtures, volatile oils, etc. When a sample evaporated to dryness leaves a clear brittle resin; no foreign odor can be detected when a few drops of the copaiba, dropped on filter paper, are cautiously warmed ; it mixes clear with ammonia and solidifies with magnesia ; and it holds the pharmacopœial test for detecting gurjun balsam ; then the copaiba is of good quality.

Medicinal Uses.—Copaiba is eliminated through the mucous membranes of the bronchial tubes, the kidneys, and skin, and is expectorant, blennorrhetic, diuretic, and diaphoretic. It is almost altogether employed in gonorrhœa after acute symptoms have subsided. Seldom used in any of the other diseases in which it is useful, on account of its bad taste and the disagreeable eructations which follow its administration.

It is a good stimulant in chronic bronchorrhœa.

Dose.—0.66 to 4 cubic centimeters (10 to 60 minims), in capsules or emulsion, alone or combined with oil of cubebs or of sandal-wood, and repeated every four to six hours.

COPAIBÆ MASSA; U. S.

Copaiba Mass.

Pilulæ Copaibæ, 1870—*Solidified Copaiba.*

Shake one thousand grams (35 ounces 120 grains) Angostura copaiba thoroughly, from time to time, for an hour with sixty grams (2 fluid-ounces) of distilled water. Then let it stand until the water separates from the balsam. Decant the balsam, separating the last by means of a separatory funnel. Mix nine hundred and forty grams (33 ounces 70 grains) of this balsam intimately with sixty grams (2 ounces 50 grains) light magnesia, and set the mixture aside until it forms a solid semi-translucent mass, stiff enough to be formed into pills.

The success of the process depends very much upon the quality of the materials. The copaiba must be one that is rich in copaivic acid (resin) rather than in volatile oil, and which also contains a sufficient quantity of water, unless the magnesia contains enough moisture. The magnesia must be one that has not been "dead-burnt," but which is

capable of becoming hydrated and then acted upon by the copaivic acid. The application of a moderate degree of heat for about fifteen minutes will hasten the process.

Dose.—0.5 to 2 grams (8 to 30 grains).

COPAIBÆ MIXTURA COMPOSITA.

Compound Copaiba Mixture.

Lafayette's Mixture, Chapman's Mixture Improved.

Mix one hundred grams (3 ounces 230 grains) copaiba and fifteen grams ($\frac{1}{2}$ ounce) volatile oil of cubeb by trituration in a Wedgewood mortar with one hundred grams (3 ounces 230 grains) glycerite of yolk of eggs. Then add gradually three hundred cubic centimeters (10 fluidounces) syrup of peppermint water, and triturate briskly until a perfect mixture is obtained. Then add, with continued stirring, sixty cubic centimeters (2 fluidounces) solution of potassa, thirty cubic centimeters (1 fluidounce) compound tincture of cardamom, sixty cubic centimeters (2 fluidounces) spirit of nitrous ether, and sufficient peppermint water to make the whole measure one thousand cubic centimeters (34 fluidounces).

Dose.—Four to fifteen cubic centimeters (1 to 4 fluidrachms).

Copaibæ Oleum; U. S.

Oil of Copaiba.

Copaibæ Ætheroleum—Volatile Oil of Copaiba.

Description.—See the Pharmacopœia, page 235.

Dose.—0.6 to 1 cubic centimeter (10 to 15 minims).

Copaibæ Resina; U. S.

Copaiba Resin.

"The residue left after distilling off the volatile oil from copaiba." It consists of *copaivic acid.*

Description.—See the Pharmacopœia, page 280.

Coptis.

Coptis.

Coptidis Trifoliæ Herba—Gelbe Niesswurz, G.; *Coptide,* F.; *Goldthread.*

Origin.—*Coptis trifolia,* Salisbury (*Ranunculaceæ*).

Habitat.—North America, and Northern Europe, and Asia.

Part used.—The entire plant.

Description.—Leaves trifoliate, the leaflets being about one centimeter ($\frac{2}{5}$ inch) long, three-lobed. The rhizome is threadlike, and of a bright golden yellow color. The flower (single) is yellowish-white. Inodorous. Taste bitter.

Constituents.—It contains the yellow crystalline alkaloid *berberine*, a white alkaloid called *coptine*, besides resin, etc. It contains no tannin.

Medicinal Uses.—It is a powerful, pure, bitter tonic, used like quassia or gentian, as a stomachic and appetizer in *dyspepsia*, *want of appetite* during convalescence, etc.

Dose.—Two to five grams (30 to 75 grains), best administered in the form of fluid extract.

COPTIDIS EXTRACTUM FLUIDUM.

Fluid Extract of Coptis.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Coptis Teeta.

East Indian Coptis.

Coptidis Teetæ Rhizoma—Mishmi Bitter, Tita.

Origin.—*Coptis Teeta*, Wallich (*Ranunculaceæ*).

Habitat.—East India.

Part used.—The rhizome.

Description.—*Tita* is about the thickness of a quill, and occurs in pieces twenty-five to fifty millimeters (1 to 2 inches) long. Sometimes it is branched at the crown, and bears remains of leaf-stalks and rootlets, giving it a rough, spiny appearance. It is yellowish-brown, and frequently contorted. Wood, bright yellow. Inodorous. Intensely bitter.

Constituents.—It contains more *berberine* than any other drug known—eight and a half per cent. having been obtained.

Properties.—It is a pure bitter tonic.

Corallium.

CORAL.

Either white or red, contains about eighty-three per cent. calcium carbonate, three and a half per cent. magnesium carbonate, seven to eight per cent. animal water ; and in the red coral about four per cent. of ferric oxide.

Finely powdered coral is sometimes used as an ingredient in tooth-powder.

Coriandrum ; U. S.

CORIANDER.

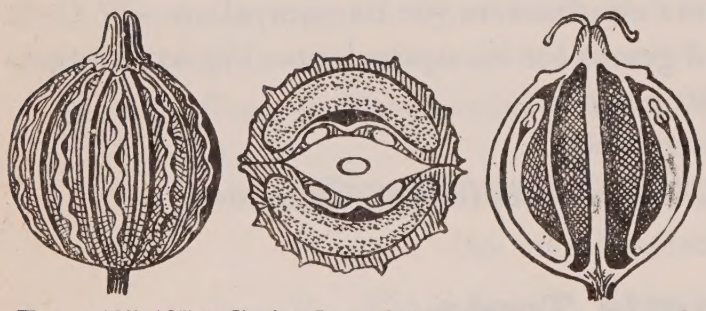
Coriandri Fructus—Koriander, G. and Sw. ; *Coriandre*, F. ; *Cilantro*, Sp.

Origin.—*Coriandrum sativum*, Linné (*Umbelliferæ*).

Habitat.—Southern Europe ; cultivated.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 87. The coriander fruits, like many others, are commonly but erroneously called "seeds." Their agreeable aroma is brought out plainly by crushing them.



FIGS. 195–197.—Coriander. Whole, transverse, and longitudinal sections, all enlarged.

Constituents.—From one-half to one per cent. volatile oil is the only important one. The fruit also contains about thirteen per cent. fixed oil.

Medicinal Uses.—Coriander is aromatic, stimulant, and carminative. It is used almost altogether as a flavoring excipient with other remedies, or as a corrective to prevent the griping effects of senna and jalap.

Dose.—0.5 to 2 grams (10 to 30 minims), or according to taste.

CORIANDRI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CORIANDER.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

Coriandri Oleum; U. S.

OIL OF CORIANDER.

Coriandri Ætheroleum—Volatile Oil of Coriander.

Description.—See the Pharmacopœia, page 236.

Carminative in doses of 0.05 to 0.3 cubic centimeter (1 to 5 minims).

CORIANDRI SPIRITUS.

SPIRIT OF CORIANDER.

Mix thirty cubic centimeters (1 fluidounce) oil of coriander with two hundred and seventy cubic centimeters (9 fluidounces) alcohol.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Coriaria.

CORIARIA.

Coriariæ Folia—Curriers' Sumach.

Origin.—*Coriaria myrtifolia*, Linné (*Coriariaceæ*).

Habitat.—Southern Europe and Northern Africa.

Part used.—The leaves.

Description.—They are twenty-five to forty millimeters (1 to $1\frac{1}{2}$ inch) long, ovate-lanceolate, pointed, entire, bluish green, smooth, shining on the upper surface; on the under surface, pale green. Inodorous. Taste astringent, bitter, somewhat acrid. (See Fig. 505, page 915.)

Constituents.—Tannin, and an exceedingly bitter, poisonous, neutral principle called *coria-myrtin*, crystallizing in white, colorless prisms, soluble in water and in alcohol.

Properties.—A violent poison, resembling picrotoxin in its effects. Three grains of *coria-myrtin* killed a large dog, and $\frac{3}{10}$ grain killed a rabbit in twenty-five minutes.

Uses.—Not medicinally employed. Said to be sometimes found among senna leaves.

Cornus; U. S.

CORNUS.

Cornus Floridæ Radicis Cortex—Dogwood Bark, Boxwood Bark.

Origin.—*Cornus florida*, Linné (*Cornaceæ*).

Habitat.—North America.

Part used.—The inner bark of the root.

Description.—See the Pharmacopœia, page 87.

When the bark is freshly broken the fractured surfaces appear either pinkish or whitish. Some pieces have remains of the brownish suber adhering in spots on the outside, or thin portions of the white wood on the inner side. Odor slight, reminding of tan-bark; taste bitter and astringent. (See Fig. 653, page 1102.)

Constituents.—The drug contains a bitter principle called *cornin* or *cornic acid*, which has been obtained in white, silky, needle-like crystals. It is soluble in water and in alcohol. Its aqueous solution is altered or destroyed by exposure to air or heat, and therefore a decoction of dogwood (Phar. 1870) is not a proper preparation to make, nor would an aqueous extract be. The drug also contains a crystallizable resinous substance, and tannin.

Medicinal Uses.—This drug belongs to the class of vegetable bitters. It is tonic and stomachic, and somewhat astringent in its action.

Dose.—1.3 to 4 grams (20 to 60 grains) of the powder.

CORNUS FLORIDÆ DECOCTUM.

Decoction of Cornus Florida.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions on page 399.)

About the same strength as the preparation of 1870. It is an unscientific preparation.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

CORNUS FLORIDÆ EXTRACTUM.

Extract of Cornus Florida.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.05 to 0.3 gram (1 to 5 grains) three times a day.

CORNUS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Cornus [Florida].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *first menstruum* use a mixture of two hundred grams (about $8\frac{1}{3}$

fluidounces) alcohol, two hundred grams (about $6\frac{2}{3}$ fluidounces) water, and one hundred grams (about $3\frac{1}{2}$ avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about $4\frac{1}{6}$ fluidounces) alcohol in every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about $5\frac{1}{2}$ fluidounces) of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters ($14\frac{1}{3}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Cornus Circinata.

CORNUS CIRCINATA.—ROUND-LEAVED DOGWOOD.

Cornus Circinatæ Cortex.

Origin.—*Cornus circinata,* L'Her (*Cornaceæ*).

Habitat.—North America.

Part used.—Bark.

Description.—Thin, greenish-gray, or brownish-gray quills or troughs, marked by corky warts ; inner surface cinnamon colored.

Constituents.—Cornin, tannin, resin, etc.

Properties and Doses.—Similar to those of Cornus Florida.

Cornus Sericea.

CORNUS SERICEA.—SWAMP DOGWOOD.

Cornus Sericeæ Cortex.

Origin.—*Cornus sericea,* L'Her (*Cornaceæ*).

Habitat.—North America.

Part used.—Bark.

Description.—Thin purplish-brown, or grayish quills or troughs. Resembles the Cornus florida, and especially the Cornus circinata.

Constituents, Properties, and Doses.—Similar to those of Cornus florida.

Corydalis.

CORYDALIS.

Dicentræ Tubera—Turkey Corn, Turkey Pea, Squirrel Corn.

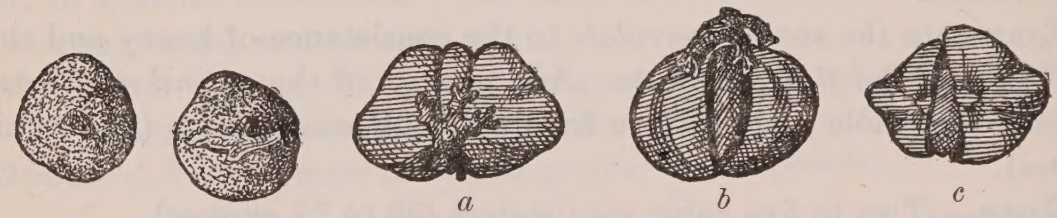
Origin.—*Dicentra canadensis*, De Candolle (*Fumariaceæ*).

Habitat.—North America, north of Kentucky.

Part used.—The tubers.

Description.—Round, from three to twelve millimeters ($\frac{1}{8}$ to $\frac{1}{2}$ inch) in diameter, gum-like, of a tawny yellowish color, and semitranslucent; internally whitish-yellow; horny; inodorous; taste persistently bitter.

Some tubers are dark brownish, opaque, and vary in diameter from



FIGS. 198–202.—Corydalis, large specimens, natural size; *a*, upper, *b*, side, and *c*, lower surface of the united tubers.

twelve millimeters ($\frac{1}{2}$ inch) down to the size of barley grains. Many are found to consist of two triangular halves, with a small round body between.

These various forms are found attached to each other by rootlets, showing them to be from the same plant.

Constituents.—An alkaloid called *corydaline*, which is very bitter, and in the drug exists combined with *fumaric acid*. Corydalis also contains acrid resin, bitter extractive, etc.

Medicinal Uses.—Corydalis is a bitter tonic, diuretic, and alterative, much employed in cases of *syphilis* and other conditions of *debility* when tonics are indicated.

Dose.—One to two grams (15 to 30 grains), best administered in the form of fluid extract.

CORYDALIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CORYDALIS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8$\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about 3$\frac{1}{3}$ fluidounces) of water.

Dose.—One to five cubic centimeters (15 to 75 minims).

Coto.

COTO BARK.

Coto Cortex.

Origin.—Some unknown South American tree.

Habitat.—Bolivia.

Description.—The bark is in pieces of from ten to sixty centimeters (4 to 24 inches) length, three to ten centimeters (1 to 4 inches) breadth, and about twelve to eighteen millimeters ($\frac{1}{2}$ to $\frac{3}{4}$ inch) thickness. Grayish-brown on the outer surface, brown internally, and rust-brown on the inner surface. Golden yellow spots abound in the fracture. It is fibrous, firm, and somewhat tough. Odor aromatic, reminding of cinnamon and mace; taste aromatic, pungent, bitter, acrid. The powder is irritating.

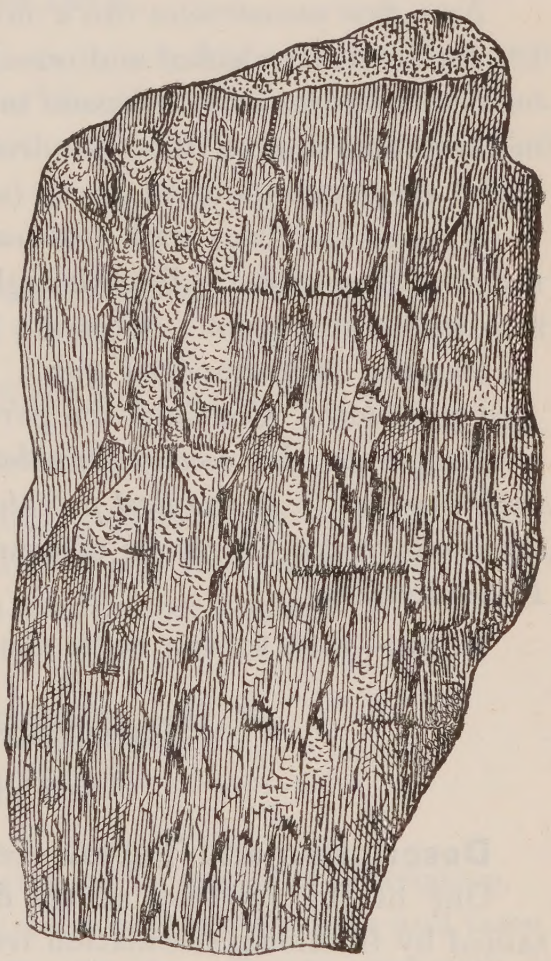


FIG. 203.—True Coto Bark. Outer surface, natural size.

Constituents.—A bitter, acrid principle called *cotoin*, of a pale yellow color. This substance is crystallizable and soluble in alcohol and in boiling water. The bark also contains a yellowish, pungent, volatile oil and two resins, one of which is acrid. It contains no tannin.

Properties and Uses.—Highly recommended as a remedy for *acute* and *chronic diarrhœa.*

Dose.—0.06 to 1 gram (1 to 15 grains).

PARACOTO BARK is thicker than true coto bark, and has a fainter odor. It contains *paracotoin, leucotin, oxyleucotin, hydrocotoin, volatile oil,* etc. Its medicinal properties are similar to those of the "genuine coto bark," but it is not nearly so effective.

COTO ABSTRACTUM.

ABSTRACT OF COTO BARK.

This is prepared from fluid extract of coto made without glycerin, using two liters (68 fluidounces) of the fluid extract to make one

thousand grams (35 ounces 120 grains) of the abstract, and adding sugar of milk, as described under the title "Abstracta."

COTO EXTRACTUM FLUIDUM.

FLUID EXTRACT OF COTO BARK.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *first menstruum* use a mixture of three hundred grams (about 12½ fluidounces) alcohol and one hundred grams (about 3½ avoirdupois ounces) glycerin. As a *second menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 7 fluidounces of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.05 to one cubic centimeter (1 to 15 minims).

Creasotum; U. S.

CREASOTE.

Description and Tests.—See the Pharmacopœia, page 87.

One of the products of the destructive distillation of wood. Obtained by fractional distillation from wood tar.

Unlike carbolic acid, pure creasote does not coagulate albumen or collodion. A mixture of equal volumes of creasote and glycerin is clear; but when diluted with twice its bulk of water it gets turbid and the creasote separates out again. Carbolic acid and glycerin will remain clear when mixed with water in the same proportions. Its behavior toward ferric chloride, as described in the Pharmacopœia, affords another distinction from carbolic acid.

"Beechwood creasote" is of superior quality.

Medicinal Uses.—Creasote is used internally mainly to check *vomiting.* It is also useful in *diarrhœas* in which the stools appear to have undergone fermentation and are of a frothy appearance.

Creasote solution is also used in inhalations in *bronchorrhœa* accompanying chronic bronchitis or consumption.

Pledgets of cotton dipped in creasote and placed in the cavity of carious teeth are often used to relieve toothache.

Dose.—0.06 to 0.125 gram (1 to 2 drops) in pill or emulsion, or in aromatic water.

CREASOTI AQUA; U. S.

CREASOTE WATER.

Shake four grams (62 grains) creasote in a bottle with four hundred cubic centimeters (13½ fluidounces) of distilled water until dissolved. Then filter through a paper-filter previously well wetted with distilled water.

A good form for administering creasote.

Dose.—Four to fifteen cubic centimeters (1 to 4 fluidrachms).

CREASOTI INHALATIO.

CREASOTE INHALATION.

Mix twenty centigrams (about 3 drops) of creasote with four cubic centimeters (about 1 fluidrachm) of alcohol and thirty cubic centimeters (1 fluidounce) of water, and inhale in the form of a spray.

Creta Præparata; U. S.

PREPARED CHALK.

See the Pharmacopœia, page 88.

Chalk freed from coarse, heavy particles by means of elutriation.

It is usually in small cones, white, of a faint earthy odor and taste; insoluble in water and alcohol. Gives a copious effervescence with dilute acids, and dissolves in hydrochloric, nitric, or acetic acid, with but slight residue.

Should be free from gritty particles.

Medicinal Uses.—Antacid. Prepared chalk is useful in *diarrhœas* with acidity of the discharges. It is often combined with other remedies, as with opium, kino, etc. It is an antidote for *poisoning by acids*, especially oxalic acid, with which it forms the insoluble oxalate of lime.

Dose.—0.5 to 4 grams (10 to 60 grains), in powder or suspended in mucilage.

CRETÆ MISTURA; U. S.

Chalk Mixture.

Triturate thirty grams (1 ounce 25 grains) compound chalk powder with sixty cubic centimeters (2 fluidounces) cinnamon water and sixty cubic centimeters (2 fluidounces) water, gradually added, until thoroughly mixed.

Must be freshly made whenever wanted for use, as it does not keep.

Popular remedy in summer diarrhœas of children.

Dose.—Five to fifty cubic centimeters (1 to 12 fluidrachms).

CRETÆ PULVIS COMPOSITUS; U. S.

Compound Chalk Powder.

Mix nine grams (139 grains) prepared chalk, six grams (92½ grains) powdered acacia, and fifteen grams (231½ grains) powdered sugar.

Used only for preparing chalk mixture. The quantities given above make about one hundred and twenty cubic centimeters (4 fluidounces) of chalk mixture.

CRETÆ PULVIS AROMATICUS.

Aromatic Chalk Powder.

Mix eleven grams (170 grains) prepared chalk, four grams (62 grains) powdered cinnamon, three grams (46 grains) powdered nutmeg, three grams (46 grains) Spanish saffron, 1.50 gram (23 grains) powdered cloves, one gram (15 grains) powdered cardamom, and twenty-five grams (386 grains) powdered sugar.

Dose.—Two to five grams (30 to 75 grains).

CRETÆ PULVIS AROMATICUS CUM OPIO.

Aromatic Chalk Powder with Opium.

Mix one gram (15 grains) powdered opium thoroughly with thirty-nine grams (1 ounce 164 grains) aromatic chalk powder.

Dose.—One to two grams (15 to 30 grains).

CRETÆ TROCHISCI; U. S.

Chalk Troches.

Mix thoroughly twenty-six grams (400 grains) prepared chalk, 6.50 grams (100 grains) powdered acacia, one gram (15 grains) nutmeg, in fine power, and thirty-nine grams (600 grains) powdered sugar. Then make a mass by adding gradually a sufficient quantity of water, and kneading with the pestle. Divide this mass into one hundred troches.

Crocus; U. S.

SAFFRON.

Croci Stigmata—Safran, G. and F.; *Azafran*, Sp.; *Saffran*, Sw.; *Spanish Saffron, True Saffron.*

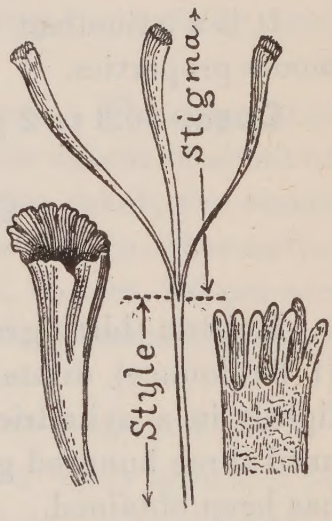
Origin.—*Crocus sativus*, Linné (*Iridaceæ*).

Habitat.—Spain, France, etc.; cultivated.

Part used.—The stigmas alone.

Description.—See the Pharmacopœia, page 88.

"Spanish saffron," as it is called in the trade, is richly orange brown, soft, flexible, not dry and harsh, has a strong peculiar odor, and an aromatic bitterish taste, and when chewed colors the saliva deep golden yellow. The style bears three stigmas, and these stigmas constitute the drug, and although they are usually united, having been picked with a portion of the style attached, there must not be a considerable portion of the styles in the drug. The styles are yellow—much lighter in color than the stigmas, which alone are the valuable part.



FIGS. 204–206.—Saffron, natural size. Stigma, enlarged, and papillæ of margin of stigma, still more enlarged.

Adulterations and Substitutions.—Owing to the high price of Spanish saffron it is often adulterated, or substituted by cheaper substances bearing more or less resemblance to it. As it requires from fifty to sixty thousand flowers to get one pound of the stigmas, it is readily understood how the drug becomes so expensive.

The ray-florets of calendula, the flowers of carthamus tinctorius, etc., have been used as adulterations, but they are readily detected by any one having any familiarity with the appearance of saffron. By dropping a pinch of the suspected saffron on the surface of some warm water the peculiar shape of the true saffron stigma will be brought out.

To make the saffron heavy it is sometimes loaded by dressing it with colored carbonate of lime. This fraud is also detected by putting the saffron in clear water, which will become turbid immediately if chalk is present.

Although true saffron has a greasy feel and touch, it does not contain any fixed oil. Spurious saffron is sometimes treated with oil in order to imitate the appearance and feel of the genuine. This is detected by a grease spot being left by it on unsized paper.

Varieties.—*Austrian saffron* is the finest, because it consists of the

stigmas alone, no portion of the style being present in it. Next comes the *Gatinais saffron*, from France ; then other French saffron, and Spanish and Italian. The bulk of the saffron sold in this country is Spanish.

Saffron of good quality is cultivated to some extent in Pennsylvania. So-called "American saffron" is not saffron at all, but *safflower* —the flowers of carthamus tinctorius (see Carthamus). So general is the substitution of carthamus for crocus that it appears to be commonly believed that the American saffron is not only the article meant by the term saffron, but that it is the kind obtained from crocus sativus.

Medicinal Uses.—Saffron is seldom employed for other purposes than that of a coloring agent.

It is a stimulant aromatic, possessing some anodyne and antispasmodic properties.

Dose.—0.3 to 2 grams (5 to 30 grains) repeated at short intervals.

CROCI TINCTURA ; U. S.

TINCTURE OF SAFFRON.

Moisten thirty grams (1 ounce) saffron with thirty cubic centimeters (1 fluidounce) diluted alcohol ; macerate twenty-four hours ; pack it tightly in a cylindrical percolator, and percolate with diluted alcohol until three hundred grams (10 ounces, or about 10 fluidounces) tincture has been obtained.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

Cubeba ; U. S.

CUBEB.

Cubebæ Fructus—Kubeben, G. ; *Cubèbe, Poivre a queue*, F. ; *Cubeba*, Sp. ; *Kubeber*, Sw. ; *Cubebs, Cubeb Berries.*

Origin.—*Cubeba officinalis*, Miquel (*Piperaceæ*).

Habitat.—Java ; cultivated.

Part used.—The unripe fruit, dried.

Description.—See the Pharmacopœia, page 88.

Cubeb is about the size and shape of black pepper, dark grayish-brown, often covered with an ash-gray bloom, very much wrinkled on the outside by the drying of the fleshy covering, the wrinkles radiating from the stalk ; internally light colored, hollow, either empty or containing a shrunken undeveloped seed. Odor strong, aromatic, somewhat reminding of thyme and of camphor ; taste bitter, pungent.

A good drug is recognized by the strong odor brought out when the berries are crushed. A drug containing a considerable quantity of stalks, or of pale, smooth, ripe berries, which look dry when broken, should be rejected.

Adulterants of cubeba have not been met with in this country.

FIGS. 207–211.—Cubebs. Natural size, enlarged, transverse and longitudinal sections and embryo, enlarged.

Constituents.—A *volatile oil*, of which the drug yields all the way from four to fifteen per cent., four per cent. resin (including the *cubebic acid*), some *cubebin*, fixed oil, etc.

The volatile oil is the most important constituent. For description, see *Cubebæ Oleum*. *Cubebic acid* is present to the extent of about one per cent., constituting one-fourth of the resin of the cubeb, the remaining three-fourths being indifferent resin. [According to other authorities the drug contains 3.4 per cent. cubebic acid, besides 3.5 per cent. *resin.*] The resins are said to possess the medicinal properties of the drug in common with the volatile oil.

Cubebin is a crystallizable substance. It has no medicinal effect.

Medicinal Uses.—In moderate doses it is a spicy aromatic and stomachic, and increases the appetite. In overdoses it causes gastro-intestinal irritation.

It is a useful stimulant to the mucous membranes of the fauces in *chronic pharyngitis*, and of the bronchial tubes in *chronic bronchitis*; it is much used as an ingredient of various troches used in these troubles.

It is mainly employed, however, in *gonorrhœa*, and may be used in all stages. It is often combined with copaiba.

It is also useful in *catarrh of the bladder*, etc.

Dose.—0.5 to 10 grams (10 grains to 2½ drachms) in powder inclosed in wafer or capsule.

CUBEBÆ EXTRACTUM.

EXTRACT OF CUBEB.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brownish black.

Dose.—0.5 to 2 grams (8 to 30 grains), several times a day.

CUBEBÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Cubeb.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and twenty-five grams (about 5⅕ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to two cubic centimeters (15 to 30 minims).

CUBEBÆ OLEO-RESINA; U. S.

Oleo-resin of Cubeb.

Pack five hundred grams (17⅔ avoirdupois ounces) cubeb, in No. 60 powder, into a cylindrical percolator, constructed with tight cover and a receptacle adapted to operations with volatile menstrua (see page 721), and percolate it slowly with stronger ether until seven hundred and fifty grams (about 1 liter, or 34 fluidounces) of percolate has been obtained. Distil off the greater portion of the ether, and expose the residue for spontaneous evaporation in a porcelain evaporating dish, until the remaining ether has disappeared. The product is then put into a wide-mouthed bottle to stand until it ceases to deposit wax and crystalline matter (cubebin), after which the oleo-resin is poured off.

The product is dark brown and consists of volatile oil, resin, some fixed oil, and coloring matter. The yield is twenty to twenty-five per cent. Should be kept in well-corked bottles.

Dose.—0.25 to 2 cubic centimeters (4 to 30 minims).

CUBEBÆ SYRUPUS.

Syrup of Cubeb.

Triturate ninety cubic centimeters (3 fluidounces) fluid extract of cubeb with thirty grams (1 ounce) precipitated phosphate of calcium, and add gradually, with continued trituration, four hundred and eighty

cubic centimeters (16 fluidounces) water. Filter. In the filtrate dissolve six hundred grams (20 ounces) sugar, without the aid of heat.

Used as an ingredient of cough mixtures.

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

CUBEBÆ TINCTURA; U. S.

TINCTURE OF CUBEB.

Moisten thirty grams (1 ounce 25 grains) powdered cubeb with thirty cubic centimeters (1 fluidounce) diluted alcohol; macerate twenty-four hours; pack it tightly in a cylindrical percolator, and percolate with diluted alcohol until three hundred grams (10 ounces 255 grains, or about 11 fluidounces) tincture is obtained.

This tincture is thirty-three per cent. weaker than that of the Pharmacopœia of 1870. The menstruum should have been alcohol.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

CUBEBÆ TROCHISCI; U. S.

CUBEB TROCHES.

Mix thoroughly 3.25 grams (50 grains) oleo-resin of cubeb, one gram (15 grains) oil of sassafras, twenty-six grams (400 grains) extract of glycyrrhiza, in fine powder, thirteen grams (200 grains) powdered acacia, and a sufficient quantity syrup of tolu to form a proper mass, from which make one hundred troches.

One every few hours in *bronchitis*, etc.

Cubebæ Oleum; U. S.

OIL OF CUBEB.

Cubebæ Ætheroleum—Volatile Oil of Cubeb.

Description.—See the Pharmacopœia, page 236. It is usually pale greenish.

Dose.—0.5 to 1 cubic centimeter (8 to 15 minims) given in syrup, mucilage, or in combination with copaiba, as in Copaibæ Mistura Composita.

Cucumis Citrullus.

WATERMELON SEED.

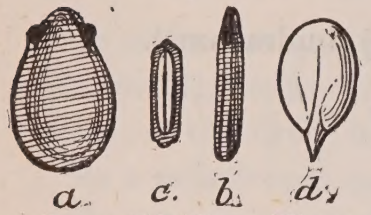
Cucumis Citrulli Semina.

Origin.—*Cucumis Citrullus*, Linné (*Cucurbitaceæ*).

Habitat.—Cultivated.

Part used.—Seeds.

Description.—About twelve millimeters ($\frac{1}{2}$ inch) long, blackish or brown, spotted, or pale brown with black edge, oval, flat.



FIGS. 212-215. — Watermelon Seed. *a*, side; *b*, edge; and *c*, transverse section, of seed; *d*, embryo.

Constituents.—Fixed oil, etc.

Properties.—Diuretic, demulcent, and anthelmintic. A decoction or tea is used *ad libitum.*

Medicinal Uses.—Often employed as a diuretic and demulcent drink in *catarrh of the bladder, retention of the urine*, etc.

Dose.—*Ad libitum.*

Cucumis Sativus.

CUCUMBER.

Cucumis Sativi Semina.

Origin.—*Cucumis sativus*, Linné (*Cucurbitaceæ*).

Habitat.—Cultivated everywhere.

Parts used.—The fresh fruit is used for making *cucumber ointment;* the seeds contain fixed oil, and are diuretic and anthelmintic.

CUCUMBER OINTMENT.

Grate seven pounds fresh cucumbers; express the juice; melt together fifteen ounces suet and twenty-four ounces lard; when the mixture of the fats begins to thicken, incorporate with it the clear cucumber juice, one-third at a time. Stir well. When the fat has been impregnated with the odor of the cucumber, pour off the liquor, remelt the fat, strain it, and then preserve it in well-covered jars, covered with a little rose-water. When wanted for use it is triturated with rose-water until white.

The suet and lard of this ointment have emollient properties.

Cuminum.

CUMIN.

Cumini Fructus—Mutterkümmel, Kreuzkümmel, Langer, oder Römischer Kümmel, Mohrenkümmel, G.; *Graines de Cumin*, F.; *Comino*, Sp.; *Spiskummin*, Sw.

Origin.—*Cuminum Cyminum*, Linné (*Umbelliferæ*).

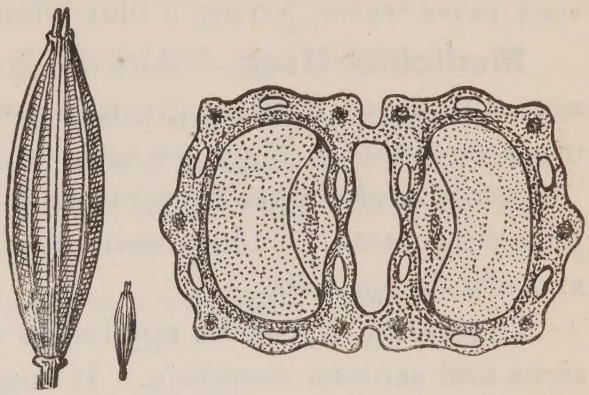
Habitat.—Europe; cultivated.

Part used.—The fruit.

Description.—It is nearly twice the size of caraway, and resembles the latter closely in its odor and taste, although cumin is less agreeable. See figure S.

Constituents.—Contains about three per cent. volatile oil. (See also Cari Oleum.)

Medicinal Uses.—A mild aromatic stimulant, carminative, and stomachic.



FIGS. 216–218.—Cumin. Natural size, enlarged, and transverse section, enlarged.

Dose.—One to two grams (15 to 30 grains).

Cumini Oleum.

OIL OF CUMIN.

Cumini Ætheroleum—Volatile Oil of Cumin.

Description.—Pale yellowish, thin, of 0.975 specific gravity, soluble in three parts alcohol. It is a mixture of *cuminol* (an aldehyd) and *cymol* (a hydrocarbon). Odor and taste resembling those of oil of caraway, but somewhat camphoraceous and coarser.

Carminative in doses of 0.05 to 0.1 gram (1 to 2 minims).

Cuprum.

COPPER.

Kupfer, G.; *Cuivre*, F.; *Cobre*, Sp.; *Koppar*, Sw.

The salts of copper are blue or green. Cupric chloride, sulphate, and nitrate are soluble in water.

Cupri Acetas; U. S.

ACETATE OF COPPER.

Cupricus Acetas—Copper Acetate.

See the Pharmacopœia, page 89.

Pure crystallized acetate of copper is made by dissolving green (not the blue variety of) verdigris in a slight excess of diluted acetic acid, filtering the solution, and evaporating to crystallization at a temperature not exceeding 60° to 80° C. (140° to 176° F.). It must be kept in well-closed bottles. The preparation consists of handsome crystals of a

dark green color, and a faint odor of acetic acid. It is soluble in fourteen parts water, giving a blue solution.

Medicinal Uses.—Salts of copper exert a peculiar influence on the nervous centres and are given in *epilepsy, chorea,* and other disturbances of nerve-action. They are tonic in small doses.

Acetate of copper in crystals is more active than the common impure subacetate. It has been given in the above-mentioned neuroses, and also in *syphilis.*

Externally it may be applied to *indolent ulcers,* with flabby granulations and sanious secretion. It may be applied in ointment. It has also been used to destroy *warts* and *corns.*

Dose.—Internally, 0.008 to 0.016 gram ($\frac{1}{8}$ to $\frac{1}{4}$ grain) two or three times daily, until gastric disturbance occurs. Externally in ointment, as a strong escharotic, four grams to thirty grams ($\frac{1}{8}$ ounce to 1 ounce); or in solution as a milder stimulant alterative application to ulcers, 0.1 to 1.5 gram in fifteen to thirty cubic centimeters (2 to 20 grains in $\frac{1}{2}$ to 1 fluidounce) of water.

Poisonous Effects.—Copper salts produce gastro-intestinal irritation and vomiting. If this latter symptom does not occur, intoxication with hyperæmia of heart and lungs may result, and death may occur from paralysis of the heart.

Antidotes.—White of egg and milk may be freely administered, accompanied or followed by emetics and the use of the stomach-pump.

Ferrocyanide of potassium has been recommended as a chemical antidote. An intimate moist mixture of seven parts iron by hydrogen, and four parts flowers of sulphur has also been recommended; also magnesia suspended in water. No chemical antidote should be relied on to the exclusion of emetics or the stomach-pump. The inflammation of the stomach or intestines must be treated on general principles with opium, demulcents, etc.

CUPRI ACETATIS CERATUM.

Cerate of Copper Acetate.

Ceratum Æruginis, Ceratum Viride—Green Cerate.

Melt together fifty grams (1 ounce 334 grains) yellow wax, twenty-five grams (386 grains) Burgundy pitch, and fifteen grams (230 grains) European turpentine; strain; incorporate thoroughly five grams (77 grains) finely powdered acetate of copper. Pour the cerate into moulds to form cakes of about one centimeter ($\frac{2}{5}$ inch) thickness. Applied to *corns, warts,* etc.

CUPRI ACETATIS TINCTURA RADEMACHERI.

RADEMACHER'S TINCTURE OF ACETATE OF COPPER.

Dissolve ten grams (154 grains) crystallized acetate of copper in one hundred and twenty cubic centimeters (4 fluid ounces) warm water, and then add sixty grams (2 ounces 50 grains, measuring about $2\frac{1}{2}$ fluidounces) alcohol.

Dose.—0.1 to 0.3 cubic centimeter (2 to 5 minims).

Cupri Sulphas; U. S.

SULPHATE OF COPPER.

Cupricus Sulphas—Copper Sulphate, Blue Vitriol, Bluestone.

Description and Tests.—See the Pharmacopœia, page 89.

By transmitted light a solution of copper sulphate is blue; by reflected light, green.

Being insoluble in alcohol this salt may be precipitated from a saturated hot aqueous solution by pouring it into alcohol. It is then obtained in small pale-blue crystals ("granulated").

Medicinal Uses.—Sulphate of copper is a valuable emetic in *croup* and in cases of *poisoning*, as it causes prompt and prolonged vomiting without much nausea or depression. It is a simple irritant emetic.

In small doses it is a neurotic, tonic, and astringent. Externally it is a valuable topical astringent stimulant in *indolent granulations*, *old ulcers*, and *chronic inflammations* of mucous membranes.

Granular conjunctivitis, *gleet*, *leucorrhœa*, and similar affections are greatly benefited by the application of its solution.

Dose.—As an emetic, 0.1 to 0.3 gram (2 to 5 grains) every ten or fifteen minutes until the effect is produced; as a tonic, 0.01 to 0.06 gram ($\frac{1}{6}$ to 1 grain) in pill; and as a local application in solution, 0.06 to 0.6 gram (1 to 10 grains) in thirty cubic centimeters (1 fluidounce) of water.

FEHLING'S SOLUTION,

Which is used as a reagent for glucose, may be made as follows:

Dissolve fifty-two grams (1 ounce 364 grains) sulphate of copper in three hundred cubic centimeters (10 fluidounces) distilled water.

Dissolve three hundred and forty-six grams (12 ounces 90 grains) Rochelle salt in twelve hundred cubic centimeters (40 fluidounces) solution of soda (specific gravity 1.12).

When the reagent is to be used, pour the solution of sulphate of

copper into the solution of Rochelle salt, add sufficient distilled water to make the whole measure two liters (68 fluidounces) and filter.

This solution should not be kept a long time, requiring to be recently made in order to be reliable.

Cupri Sulphas Ammoniacalis; Sw.

AMMONIATED SULPHATE OF COPPER.

Cupricus Sulphas Ammoniacalis.

Dissolve thirty grams (1 ounce) pure sulphate of copper in ninety cubic centimeters (3 fluidounces) water of ammonia, and then add one hundred and eighty grams (6 ounces, or about 6½ fluidounces) of ninety per cent. (by volume) alcohol. Collect the precipitate on a filter, dry it between filter-paper as rapidly as possible without the aid of heat, and put into small bottles, which must be tightly corked (the corks to be dipped in melted paraffin). Its formula is $(H_3N)_2CuO$.

A beautiful, deep-blue, crystalline powder; thirty grams (1 ounce) dissolves in forty-five grams (1½ ounce) water.

Medicinal Uses.—This salt possesses the properties of copper salts in a marked degree. It has been highly praised for its effects in *chronic neuroses*, *epilepsy*, *chorea*, etc., especially if accompanied by weakness of the digestive organs, or if complicated with syphilitic or other cachexias. It has also been employed in *hysteria*.

Dose.—0.01 to 0.2 gram (⅛ to 3 grains), three times a day, with meals. Best given in pills coated with gelatine or tolu.

Cuprum Aluminatum.

ALUMINATED COPPER.

Lapis Divinus.

Melt thirty grams (1 ounce) copper sulphate, thirty grams potassa alum, and thirty grams potassium nitrate in a porcelain evaporating dish. Pour the melted mass upon a plate. When cold rub it into powder, and mix with it, intimately, two grams (30 grains) camphor. Keep the product in a tightly closed bottle.

Only used externally as a stimulant astringent application to *ulcers*, etc., and in solution as an eye-wash.

Cuprum Ammoniatum.

AMMONIATED COPPER.

Triturate three grams (46 grains) ammonium carbonate with four grams (61 grains) copper sulphate until effervescence has ceased. Then

fold the mixture in filter-paper and dry it in a moderately warm place. Keep the product in a well-corked bottle.

Medicinal Uses and Dose similar to those of ammoniated sulphate of copper.

Curare.

CURARE.

Urari, Wourari, Wourali, Wourara.

Origin.—Unknown. Presumed by some to be from a species of *Strychnos* or *Cocculus*, or both. Considering its action it is improbable that it should be obtained from any variety of strychnos.

Geographical Source.—South America, where it is used as an arrow-poison.

Description.—A blackish-brown, dry, extract-like, brittle substance, which is soluble in water; inodorous, very bitter. It is very variable in its composition and properties.

Constituents.—It is evidently a mixture of several substances. The principal constituent is the extremely poisonous alkaloid *curarine.*

Medicinal Uses.—The property of woorara to cause paralysis of the voluntary muscles has led to its employment in several nervous disorders accompanied by spasm, especially *tetanus.* When given by the stomach it generally produces no effect, therefore it must be given hypodermically.

It has been given in doses of 0.006 to 0.02 gram ($\frac{1}{10}$ to $\frac{1}{3}$ grain), the first being the average dose. This substance is extremely poisonous, and must be used with caution owing to its variability.

Curcuma.

CURCUMA.

Curcumæ Rhizoma—Kurkuma, Gelbwurz, G.; *Curcuma, Souchet des Indes,* F.; *Gurkmeja,* Sw.; *Turmeric.*

Origin.—*Curcuma longa,* Linné (*Zingiberaceæ*).

Habitat.—Southern Asia.

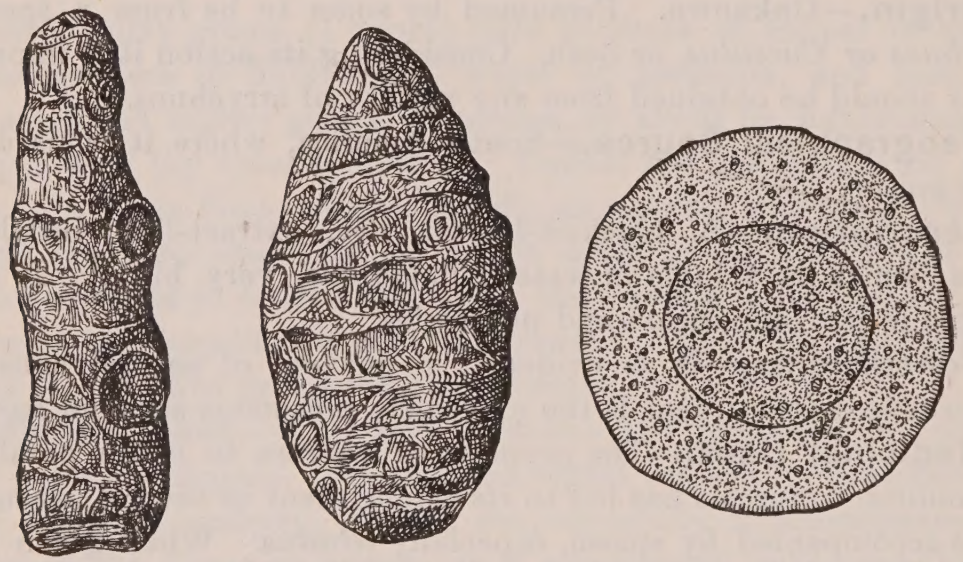
Part used.—The rhizomes.

Description.—Oblong, from three to five centimeters (1 to 2 inches) long, and half as thick, being then called *round turmeric;* or only about one centimeter ($\frac{2}{5}$ inch) thick, being then called *long turmeric.* It is yellowish gray externally, marked by more or less distinct transverse rings; internally it is orange yellow, or brownish yellow. It has a slight ginger-like odor, and a warm, bitter, aromatic taste. The powder is rich deep yellow, and turns brown with alkalies.

Varieties.—In the trade distinction is made between *light* and *dark* turmeric (or *yellow* and *red* turmeric), and between *long* and *round* turmeric.

Chinese turmeric is the best, but does not occur in our market. *Madras* comes next ; it is generally large, orange yellow. *Bengal* turmeric is gray externally, and smoother than the Madras variety, and has a darker red color within.

Constituents.—Volatile oil, resin, and an orange-yellow, resinous



FIGS. 219–221.—Long and round Turmeric—large specimens, natural size ; and transverse section of long turmeric, enlarged.

coloring matter called *curcumin*, which in solution has a greenish fluorescence.

Medicinal Uses.—Curcuma is a stimulant carminative, resembling ginger in its action, but it is not employed internally.

It is used to prepare a test-paper and as a coloring agent.

Powdered turmeric is occasionally used as an adulterant to spices, etc., to impart a fresh color. The form of its starch is easily recognized under the microscope.

CURCUMÆ TINCTURA.

TINCTURE OF TURMERIC.

Percolate diluted alcohol through two hundred and fifty grams (8¾ ounces) ground turmeric, previously moistened and packed firmly in a cylindrical percolator, until five hundred cubic centimeters (17 fluid-ounces) tincture has been obtained.

Used for coloring alcoholic liquids. It is, however, rather unsatisfactory on account of the greenish fluorescence it imparts, and will be superseded by yellow anilin.

CURCUMÆ PULVIS AROMATICUS.

CURRY POWDER.

Mix well thirty grams (1 ounce 25 grains) turmeric, thirty grams coriander, twenty grams (308 grains) black pepper, ten grams (154 grains) fenugreek, ten grams ginger, two grams (31 grains) Cayenne pepper, and two grams cumin, all in moderately fine powder.

Cydonium ; U. S.

CYDONIUM.

Cydonii Semina—*Quittensamen, Quittenkerne*, G.; *Semences de Coing, Pépins de Coing*, F.; *Membrillo*, Sp.; *Qvittenkärnor*, Sw.; *Quince Seed.*

Origin.—*Cydonia vulgaris*, Persoon (*Rosaceæ*).

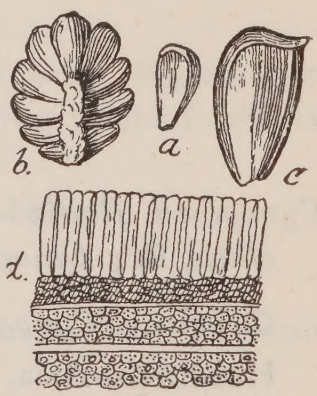
Habitat.—Cultivated.

Part used.—The ripe seeds.

Description.—See the Pharmacopœia, page 89.

They are grayish brown, triangularly compressed, about the size of apple seeds, odorless, and swell in water, forming an insipid, clear mucilage.

Must be clean, whole, sound, odorless, and yield a good mucilage.



FIGS. 222–225.—Cydonium. *a*, natural size; *b*, agglutinated, natural size; *c*, enlarged; *d*, section through seedcoats, enlarged.

Constituents.—The only important constituent is the vegetable mucilage, of which it yields about twenty per cent., and which is contained in the epithelial cells. In making the mucilage the seeds need not be broken.

Apple and pear seeds, mixed with the drug, may be recognized by their smooth oval form, and by the fact that they do not become surrounded by mucilage when put into water.

CYDONII MUCILAGO ; U. S.

MUCILAGE OF CYDONIUM.

Macerate six grams (93 grains) cydonium (whole) about half an hour in a bottle with three hundred cubic centimeters (10 fluidounces) distilled water, shaking frequently. Strain through muslin without using pressure.

Must be freshly made when wanted. Rose-water, instead of water, is often used.

(The preparation of the German Pharmacopœia is made as above, with the exception that 6.5 grams (or 100 grains) of quince seed are taken instead of six grams.

The mucilage of quince seeds may be used like that of acacia as a demulcent in *inflammation of the skin* or of the mucous membranes of the alimentary canal; also as a demulcent vehicle for more active remedies. It is given *ad libitum.*

BANDOLIN.

One hundred and twenty grains (8 grams) of quince seeds are macerated in one pint (500 cubic centimeters) of water, and the mucilage is strained through a cloth. One fluidounce of Cologne water, with or without other scents, is added.

Much used as a cosmetic preparation for the toilet. It is applied to the hair, which is then dressed, and retains its position well upon the drying of the bandolin.

Cynoglossum.

CYNOGLOSSUM.

Cynoglossi Radix—Houndstongue, E.; *Hundszunge*, G.; *Langue de chien*, F.; *Cinoglosa, Lengua de perro*, Sp.; *Cynoglossum*, Sw.

Origin.—*Cynoglossum officinale*, Linné (*Boragineæ*).

Habitat.—Asia, Europe, and North America.

Part used.—The root.

Description.—Cylindrical, longitudinally wrinkled, sometimes sliced lengthwise, crowned by remnants of stems and the broad, hairy leaf-stalks; externally blackish brown, whitish within. Brittle when well dried, but readily absorbs moisture and becomes tough. In the fresh state it has a disagreeable odor, reminding of rats; when dry it is inodorous. Taste sweetish, mucilaginous.

Constituents.—Buchheim found in it a brown, amorphous, hygroscopic substance, soluble in water and alcohol, and having an alkaline reaction, which he found to possess narcotic properties, and gave the name *cynoglossine.*

Medicinal Properties.—Said to be analogous in its effects to *curare.*

Cypripedium; U. S.

CYPRIPEDIUM.

Cypripedii Radix—Ladies' Slipper, American Valerian.

Origin.—*Cypripedium pubescens*, Willdenow, and *Cypripedium parviflorum*, Salisbury (*Orchidaceæ*).

Habitat.—North America.

Parts used.—The rhizomes and rootlets.

Description.—See the Pharmacopœia, page 90. The rootlets are golden brown. Odor strong (not "faint"), heavy, very disagreeable.

Constituents.—A small quantity of volatile oil, a volatile acid, resinous matters, and some tannin.

Medicinal Uses.—Ladies' slipper, or American valerian, as the latter name implies, possesses the general properties of valerian. It is tonic, stimulant, diaphoretic, and antispasmodic.

It is useful in cases of *nervous excitability* unaccompanied by organic lesions, as in *hysteria*, *nervous headache*, *morbid wakefulness*, etc. It sometimes ameliorates the symptoms of *epilepsy* when depending on reflex irritation.

The **dose** of the powder is one to two grams (15 to 30 grains), repeated as required. It is preferably given in the form of fluid extract.

CYPRIPEDII EXTRACTUM.

EXTRACT OF CYPRIPEDIUM.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brownish black.

Dose.—0.05 to 0.3 gram (1 to 5 grains) two or three times a day.

"Cypripedin," or "Oleo-resin of Cypripedium" of the eclectic physicians is simply an impure alcoholic extract.

CYPRIPEDII EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF CYPRIPEDIUM

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and seventy-five grams (about 7⅓ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical perco-

lator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to two cubic centimeters (15 to 30 minims).

Damiana.

DAMIANA.

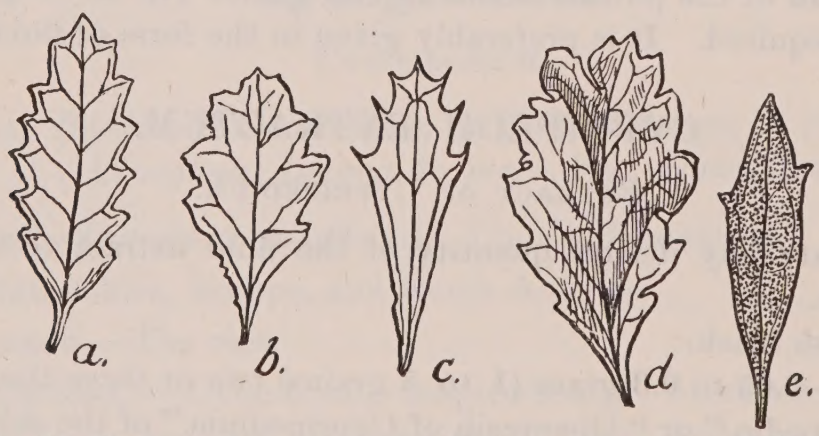
Turneræ Folia.

Origin.—*Turnera aphrodisiaca*, Ward and Vasey ; *T. microphylla*, De Candolle, and other species of *Turnera* (*Turneraceæ*).

Habitat.—Mexico and Lower California.

Part used.—The leaves.

Description.—The form and size of the leaves are shown in the figures. The drug is usually so broken up that it is difficult to find any



FIGS. 226-230.—Damiana. *a*, *b*, *c*, varieties of Mexican damiana ; *d*, California damiana ; *e*, Aplopappus leaf.

whole leaves in it. It has a sound light green color, and an agreeable aromatic odor, and a slightly aromatic taste. Mexican damiana consists of very small leaves, which are smooth—Figs. *a*, *b*, *c* ; California damiana consists of larger and broader leaves—Fig. *d*.

False Damiana.—The leaves of *Aplopappus discoideus*, De Candolle, are frequently sold as damiana. Their appearance is shown in *e*. They are generally mixed with some of the flower-heads, and may be readily distinguished from true damiana. False damiana has a very different odor and taste, from those of the genuine, resembling somewhat Grin-

delia. Aplopappus leaves contain resinous matter, but do not possess the aroma of damiana.

Constituents.—True damiana contains volatile oil and resin.

Properties.—Largely used for its supposed aphrodisiac effects. It is stimulant and diuretic.

Dose.—Five to ten grams (1 to 2½ fluidrachms) in the form of fluid extract.

DAMIANÆ EXTRACTUM.

EXTRACT OF DAMIANA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.15 to 0.75 gram (2½ to 12 grains).

DAMIANÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DAMIANA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Decocta.

DECOCTIONS.

Abkochungen, G.; *Décoctions*, F.; *Cocimiento*, Sp.; *Dekokter*, Sw.

Decoctions are aqueous preparations made by subjecting the drug to the solvent action of water at the boiling-point. Mucilaginous and astringent drugs are those from which decoctions are principally prepared. Tough and dense woods, roots, barks, etc., not readily penetrated by solvents are subjected to continued treatment with boiling water in preference to making infusions of them. Drugs containing volatile principles which would be dissipated by heat, and those containing substances altered in character at the boiling-point of water are not to be made into decoctions. In fact, the drugs from which decoctions may be advantageously prepared are limited in number. The long lists of decoctions formerly used, when pharmacy was less advanced, have at length been so reduced that in the new Pharmacopœia of the United States only two remain. With the exception of decoctions of barley, cetraria, and a few similar drugs, we believe decoctions to be

extremely crude preparations which can be advantageously dispensed with in favor of the fluid extracts or other rational preparations. While decoction of logwood is efficient, fluid extract of logwood is more so. A fluid extract is stronger, thus requiring a smaller dose to be given, and it represents the soluble active constituents of the drug more perfectly and uniformly, while at the same time it keeps permanently.

It is not strictly true that resins, alkaloids, and other substances ordinarily nearly or quite insoluble in water are not taken up in decoctions, for by the aid of other substances associated with them in the drug they do enter into solution in both infusions and decoctions to an appreciable extent ; but the fluid extracts, made with the menstrua best adapted to the extraction of the constituents of the drug in each case, must be superior to aqueous solutions obtained from drugs the activity of which depends upon substances only partially soluble in water even under the most favorable conditions and insoluble in it when isolated from the drug.

With the exception of starch, gum, and albuminous matters, which are insoluble or nearly so in alcoholic liquids, the constituents extracted by water alone are even more freely dissolved by water and alcohol combined, besides which an alcoholic menstruum exhausts drugs over which water has no effective solvent power.

Decoctions always contain all the mucilage and starch that was in the drug if the latter was in such comminuted condition as to be penetrated by the boiling water. It coagulates, however, and separates in that way, all the albuminous matter. But the coagulated albumen is apt to so envelop the drug that the water can not freely penetrate it to dissolve other substances which it is intended to extract. Alcohol, on the other hand, extracts the active substances to the exclusion of the inert gum, starch, and albumen. This is a material advantage in every case where the virtues of the drug do not depend upon the mucilage or starch.

Keeping Qualities.—Decoctions will not keep even a week in warm weather. Ordinarily, in hot weather, they spoil within forty-eight hours unless some substance is added which will prevent decomposition, or retard it.

"Decoctions" from Fluid Extracts.—To make "decoctions" (?) by mixing the fluid extract with hot water is entirely wrong. This practice should be discouraged by all means. A fluidounce of fluid extract mixed with a pint of boiling water is a very different thing from a pint of decoction made in a proper manner from one ounce of the drug. Nevertheless it is customary to publish directions for making decoctions, infusions, etc., from the fluid extracts, in price-lists and on

labels. It is difficult to understand why this slovenly practice should be tolerated when it is a fact that decoctions and infusions are seldom prescribed and might well be dispensed with altogether.

Official Process.—The Pharmacopœial general directions for preparing decoctions are as follows :

When an "ordinary" unofficial decoction is prescribed by the physician without specifying its strength, the crude drug, coarsely comminuted (cut, crushed, or bruised), together with ten times its weight of water is to be put into a suitable vessel, such as a pan which can be well covered, and the contents are boiled fifteen minutes, after which the decoction is allowed to cool to about 45° C. (113° F.), and strained, adding enough water through the strainer to make the weight of the product just ten times the weight of the crude drug used. In other words, to make any "ordinary" decoction, take thirty grams (1 ounce) drug to make three hundred grams (about 10 fluidounces) of decoction, proceeding as described.

The decoctions of the old Pharmacopœia (1870) were, as a general rule, prepared from thirty-one grams (1 troyounce) drug to about four hundred and eighty grams (16 fluidounces) of finished product. Decoctions made according to the general rule of the present Pharmacopœia will, therefore, be about thirty per cent. stronger.

We give give below a list of all the decoctions of the two editions of the U. S. Pharmacopœia, 1870 and 1880, and their respective strengths. The figures all represent weight. It will be found that one avoirdupois ounce of drug will, according to the proportions of the Pharmacopœia of 1870, yield fourteen and one-half U. S. fluidounces of decoction, this corresponding to sixteen fluidounces from each *troyounce ;* and fourteen and one-half fluidounces of decoction will weigh about fifteen avoirdupois ounces. Hence—

	1870.	**1880.**
Decoctum Cetrariæ	1 to 30	1 to 20
" Chimaphilæ	1 " 15	1 " 10
" Cinchonæ Flavæ	1 " 15	1 " 10
" Cinchonæ Rubræ	1 " 15	1 " 10
" Cornus Floridæ	1 " 15	1 " 10
" Dulcamaræ	1 " 15	1 " 10
" Hæmatoxyli	1 " 15	1 " 10
" Hordei	1 " 15	1 " 10
" Quercus Albæ	1 " 15	1 " 10
" Sarsaparillæ Comp.	1 " 10	1 " 10
" Senegæ	1 " 15	1 " 10
" Uvæ Ursi	1 " 15	1 " 10

In Decoctum Sarsaparillæ Compositum the proportion of Mezereon has been increased sixty per cent. (See Sarsap. Decoct. Comp.)

The increase in strength of the decoctions is an improvement.

Delphinium.

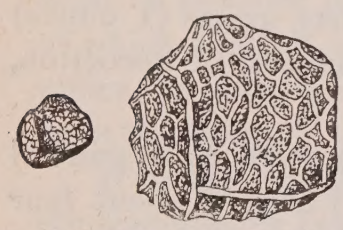
DELPHINIUM.

Delphinii Semina—Larkspur Seed; Rittersporn-Samen, G.; *Semence de pied d'alouette*, F.

Origin.—*Delphinium consolida*, Linné (*Ranunculaceæ*).

Habitat.—Central Europe.

Part used.—Seeds.



FIGS. 231, 232.—Delphinium, natural size and enlarged.

Description.—Flat, angular, four-sided, externally black, internally whitish, oily. Odor, none; taste, bitter, acrid. See Figs. 231, 232.

Constituents.—The alkaloid *delphinine*, which is very poisonous. The seeds also contain fixed oil.

Properties.—Diuretic, cathartic, emetic; externally rubefacient; seldom used.

Dose.—0.06 to 0.2 gram (1 to 3 grains).

DELPHINII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DELPHINIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.2 cubic centimeter (1 to 3 minims).

Dialysis.

In pharmacy dialysis means the diffusion of certain substances in solution through a septum consisting preferably of parchment paper. A *dialyzer* may be constructed of a hoop, a sieve, a short piece of sewer-pipe, or any other shallow vessel, by simply tying the parchment paper securely over it so as to form a receptacle for the liquid to be *dialyzed*. Dialyzers are usually made about two to five inches deep, and from five to twelve inches in diameter. They are placed on supports in a large vessel of distilled water, in such a way that the surface of the liquid in the dialyzer is slightly above the level of the water out-

side it. The vessels being arranged in this manner the crystallizable substances contained in the liquid in the dialyzer will diffuse through the septum of parchment paper and mix with the water in the outer vessel, while the uncrystallizable ("colloid") substances remain in the dialyzer. The water in the outer vessel must be frequently changed. The liquid remaining in the dialyzer after diffusion has ceased is called the *dialysate.* The law of *osmosis* ("endosmosis" and "exosmosis"), upon which the process of dialysis depends, will be found explained in works on physics and chemistry.

Digitalis; U. S.

DIGITALIS.

Digitalis Folia—Digitalis Leaves; Fingerhutkraut, G.; *Feuilles de digitale,* F.; *Digital, Dedalera,* Sp.; *Fingerborgörtblad, Digitalis,* Sw.; *Foxglove.*

Origin.—*Digitalis purpurea,* Linné (*Scrophulariaceæ*).

Habitat.—Europe.

Part used.—The leaves (collected from the plant in its second year's growth while flowering, and carefully dried).

Description.—See the Pharmacopœia, page 91. Wrinkled, downy on the underside, and coarsely net-veined; midrib thick.

A tasteless, bleached, or discolored drug must be rejected.

The supply must be renewed every season. Must be preserved in well-closed vessels and protected from the light.

Digitalis, matico, and mullein leaves have been confounded with each other. By comparing the figures of digitalis and matico the differences between these two drugs will be found sufficiently obvious. Mullein leaf is covered with branched hairs, which distinguish it from the other drugs.

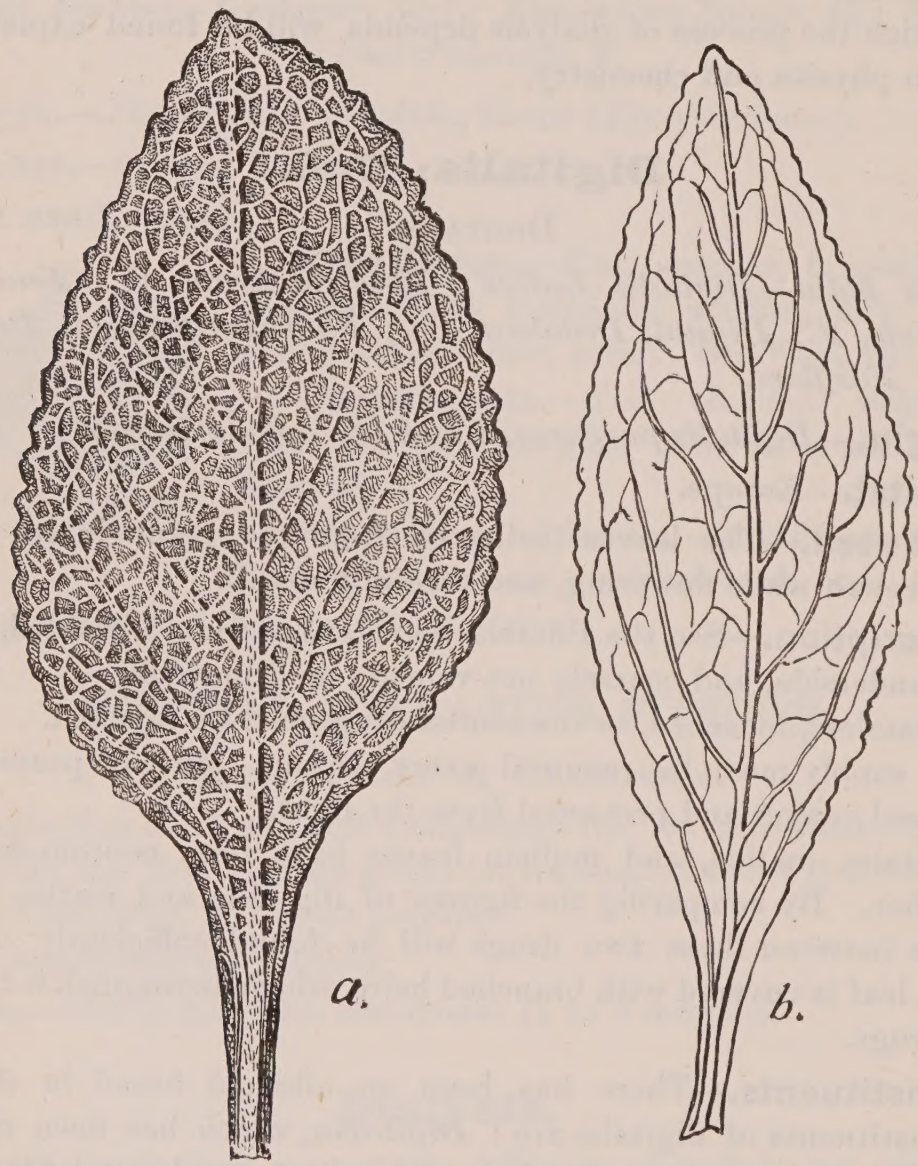
Constituents.—There has been no alkaloid found in digitalis. The constituents of digitalis are: *Digitoxin,* which has been obtained in colorless scales and needles, is insoluble in water, but soluble in alcohol. Its alcoholic solution is intensely bitter. It is so extremely powerful a poison that its discoverer (Schmiedeberg) considers it unfit for medicinal uses in an isolated form. It possesses in a high degree the medicinal properties of the drug.

Digitalin, as obtained in colorless needle-shaped crystals (by Nativelle), is also an exceedingly powerful poison possessing the properties of digitalis. It is not an alkaloid. It has an extremely bitter taste. When moistened with hydrochloric acid it assumes an intense emerald

green color. This digitalin is not at all like the "Digitalin" which was official in the U. S. Pharmacopœia of 1870 (see below).

Another constituent of digitalis is called *digitalein*. It is chemically indifferent. Its medicinal properties have not been investigated.

Medicinal Uses.—Digitalis is an excito-motor, stimulating the action of the heart. By increasing the power of the contraction of the



FIGS. 233, 234.—Digitalis. *a*, second year's leaf, natural size; *b*, outlines of first year's leaf, natural size.

heart, and at the same time prolonging the diastole, digitalis enables one beat of the heart to be more effectual in propelling the blood than two or three beats were before, and therefore reduces the number of heart-beats. The use of this drug is therefore indicated when the action of the heart is rapid and weak, with insufficient aëration of the blood, as shown by cyanosis. Digitalis also possesses the power to contract the small arterioles, and is useful, like ergot, in *hæmoptysis*, *menorrhagia*,

and other *hemorrhages*. It is also diuretic, especially in infusion, valuable in *dropsies* depending on mechanical impediments, in *cardiac diseases*, and in *scarlatinal dropsy*. In some nervous diseases digitalis has been given with good effect, as in *delirium tremens*, *acute mania*, etc., and in these diseases large doses were found to be tolerated.

Dose.—0.03 to 0.3 gram ($\frac{1}{2}$ to 5 grains) of the powdered leaf.

Poisonous Effects.—In overdoses this drug may kill by causing too powerful contraction or tetanic spasm of the heart. If the effect is not sudden, the over-excitement of the heart may be followed by a corresponding exhaustion which may prove fatal more slowly.

In toxic doses it produces headache, dizziness, exhaustion, and sometimes delirium, and destroys the sensibility of both motor and sensory nerves.

The poisonous effects must be counteracted by opium, aconite, or other remedies which exert a depressing or paralyzing effect on the heart. Still these are not perfect physiological antagonists. Bartholow states that saponin is the most perfect antagonist known. In case of depression stimulants must be given.

Cumulative Effects.—Digitalis is apt to produce a cumulative effect, and care is therefore required in its use.

DIGITALIS ABSTRACTUM; U. S.

Abstract of Digitalis.

Two hundred grams (7 ounces 24 grains) digitalis leaves, in No. 60 powder, is moistened uniformly (by rubbing between the hands) with eighty grams (or about $3\frac{1}{3}$ fluidounces) of alcohol. The moist powder is packed tightly in a tall cylindrical percolator. More alcohol is now added until the mass is saturated and the liquid begins to drop at the lower end of the percolator, while a layer of the alcohol still covers the upper surface of the drug. The exit of the percolator is now closed and the top covered to prevent evaporation. The whole is allowed to stand forty-eight hours. Then the percolation is started, adding alcohol as required to keep the drug always covered. When two hundred cubic centimeters (or 7 fluidounces) percolate has been obtained, set that portion aside. Place another receiver under the percolator and continue the process until the drug is exhausted. Evaporate this second percolate down until it weighs thirty grams (1 ounce). Mix this with the reserved portion. The mixed liquids, weighing two hundred grams (7 ounces), are put in a tared evaporating dish with sixty grams (2 ounces) powdered milk-sugar, and set in a place where the temperature is between 40° and 50° C., or from 104° to 122° F., until the mixture is

dry. Then enough powdered sugar of milk is added to make the total weight of the product one hundred grams (3 ounces 230 grains). The whole is now triturated until a uniform and very fine powder is obtained.

The same product may be obtained by evaporating one thousand cubic centimeters of the fluid extract of digitalis leaf with the requisite quantity of milk sugar, making five hundred grams finished product.

[Two avoirdupois pounds of powdered digitalis leaf will yield one pound of abstract. This will require one-half pint alcohol for moistening, and about half a pint more for saturating the drug preparatory to the forty-eight hours' maceration. The reserved portion will measure about two pints, and the second percolate, after evaporation to the prescribed point, will measure nearly six fluidounces.]

The **dose** is about 0.05 to 0.20 gram (1 to 3 grains).

DIGITALIS EXTRACTUM; U. S.

Extract of Digitalis.

Take five hundred grams (17⅔ avoirdupois ounces) recently dried digitalis leaves, in No. 60 powder. As a menstruum use first a mixture of one thousand grams (about 41¾ fluidounces) alcohol, and five hundred grams (17 fluidounces) water, to be followed afterward by diluted alcohol (1880). Moisten with two hundred grams (about 8 fluidounces) of the mixture. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Then percolate until the drug is exhausted or until one thousand five hundred grams (about 56 fluidounces) of percolate has been received. Distil off the alcohol in the usual way. Evaporate the remainder to the pilular consistence, and incorporate with the extract, while still warm, one-twentieth of its weight of glycerin.

Practically the same product is obtained by evaporating the fluid extract of digitalis to the proper consistence and then adding the five per cent. of glycerin.

Greenish brown. Yield about twenty to twenty-five per cent.

Dose.—0.01 to 0.03 gram (⅙ to ½ grain).

DIGITALIS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Digitalis.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion

of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 7 fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.2 to 2 cubic centimeters (3 to 30 minims); large doses with care!

DIGITALIS INFUSUM; U. S.

Infusion of Digitalis.

Mix six grams (90 grains) digitalis, in No. 20 powder, and six grams (90 grains) cinnamon, in No. 20 powder; pour upon the mixture three hundred and seventy cubic centimeters (12½ fluidounces) of boiling water, and macerate two hours in a covered jar. Then strain the infusion, add thirty grams (10 fluidrachms) alcohol, and pass enough water through the strainer to make the infusion weigh four hundred grams (or measure about 13½ fluidounces).

The strength of this infusion is about the same as that of the preparation of the old Pharmacopœia.

This preparation is a valuable diuretic which is often used in cases of dropsy, especially if dependent on cardiac trouble. It is often combined with saline diuretics.

Dose.—Fifteen to thirty cubic centimeters (½ to 1 fluidounce) several times a day.

DIGITALIS TINCTURA; U. S.

Tincture of Digitalis.

Moisten forty-five grams (1 ounce 257 grains) digitalis, in No. 60 powder, with forty-five cubic centimeters (1½ fluidounce) diluted alcohol; macerate twenty-four hours; pack tightly in a cylindrical percolator, and percolate with diluted alcohol until three hundred grams (10 ounces 255 grains, or about 10½ fluidounces) of tincture has been obtained.

Dose.—0.3 to 4 cubic centimeters (5 to 60 minims).

Digitalinum; U. S. 1870.

DIGITALIN.

This preparation has been expunged from the new Pharmacopœia. As prepared by the process given in the Pharmacopœia of 1870 (identical with that of the British Pharmacopœia) it was of very variable composition and therapeutic energy. But this is not all. While the digitalin of the Pharmacopœia was "white or yellowish white," and dry, the kinds of digitalin actually in the shops are frequently nearly black, extract-like. The official digitalin was nearly insoluble in water, while German digitalin is readily soluble in that solvent. Hydrochloric acid vapors turn German digitalin brown, but French, English, or American digitalin green.

Being in one shop a dry white powder, and in another a blackish soft extract; in one case nearly insoluble in water, and in another quite soluble, it is not surprising that the preparation came into disrepute. The different kinds of digitalin on the market are mixtures of several substances, the most important of which is digitoxin (see Digitalis). Their therapeutic properties may be similar in kind, but differ greatly in degree.

Medicinal Uses.—The same as those of digitalis. We believe it to be a dangerous and uncertain remedy.

It is given in doses of 0.001 to 0.002 gram ($\frac{1}{60}$ to $\frac{1}{30}$ grain), usually in the form of granules.

Dioscorea.

DIOSCOREA.

Dioscoreæ Rhizoma—Wild Yam.

Origin.—*Dioscorea villosa*, Linné (*Dioscoraceæ*).

Habitat.—The United States, east of the Mississippi.

Part used.—The rhizome.

Description.—The drug is well represented in the figure. It has a pale brownish color externally, and is whitish and starchy within. It is very firm and tough, being very difficult to powder. The bark is thin. It is inodorous, and has no perceptible taste unless chewed for a minute or longer, when it develops an acrid impression.

Prof. J. U. Lloyd, of Cincinnati, states that there are two distinct varieties of dioscorea, viz., the one shown in the figure, obtained from

Dioscorea villosa with pubescent leaves, and another from Dioscorea villosa (var. *Glabra*) with glabrous leaves. The former is the only kind now found in the market, whereas the latter is said to be the drug originally introduced by eclectic physicians, and the only true drug possessing the properties for which the wild yam is valued.

Constituents.—An acrid resin is said to be contained in the drug.

Medicinal Uses.—It is said to be almost a specific in *bilious colic, cholera morbus* with *cramps, spasmodic hiccough*, etc.

It is also claimed to be expectorant and diaphoretic.

Dose.—0.5 to 2 grams (8 to 30 grains), given in infusion or fluid extract.

FIG. 235.—Dioscorea.

DIOSCOREÆ EXTRACTUM.

EXTRACT OF DIOSCOREA.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Dark brown.

This extract, when dried and powdered, is frequently called "*Dioscorein.*"

Dose.—0.06 to 0.25 gram (1 to 4 grains), repeated if necessary.

DIOSCOREÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DIOSCOREA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

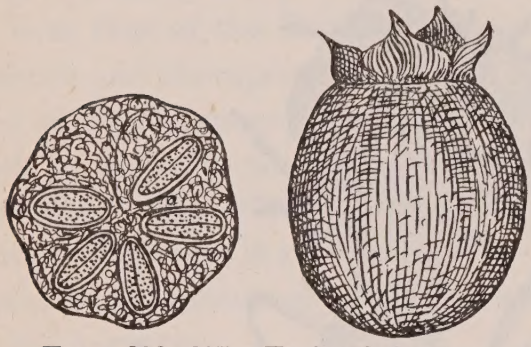
Diospyros.

PERSIMMON.

Diospyri Fructus.

Origin.—*Diospyros virginiana*, Linné (*Ebenaceæ*).

Habitat.—United States.



FIGS. 236, 237.—Fruit of Persimmon, natural size, whole, and in transverse section.

Part used.—Unripe fruit.

Description.—Form and size as seen in the figures; green, smooth, with a pleasant fruit-like odor. The very astringent taste of the persimmon disappears upon exposure to frost, and the fruit becomes, instead, acidulous and sweet.

Constituents.—Tannin, malic acid, etc.

Properties.—It is astringent.

Dose.—One to four grams (15 to 60 grains).

Dipterix.

TONKA BEAN.

Diptericis Semina.

Origin.—*Dipterix odorata* and *Dipterix oppositifolia*, Willdenow (*Papilionaceæ*).

Habitat.—Guiana.

Part used.—The seeds.

Description.—They are four to five centimeters ($1\frac{1}{2}$ to 2 inches) long, and about thirteen millimeters ($\frac{1}{2}$ inch) broad. The form is shown in Fig. 238. Externally the "beans" are blackish brown, wrinkled, sometimes covered with small, white, needle-like crystals of *coumarin;* internally pale brown, oily. Odor fragrant; taste aromatic, bitter.

FIG. 238.—Tonka Bean, natural size.

Varieties.—*Dutch tonka* beans are the best. They are rather larger, plumper, and more frequently found covered with crystals than the *English.*

Constituents.—The pleasant aroma, which is sweet and reminds of vanilla, is due to *coumarin*, a neutral, odorous, crystalline principle, soluble in diluted alcohol. The tonka bean also contains fixed oil, sugar, mucilage.

Uses.—For flavoring purposes.

DIPTERICIS TINCTURA.

TINCTURE OF TONKA.

Make one liter (34 fluidounces) tincture from five hundred cubic centimeters (17⅔ avoirdupois ounces) ground tonka bean by percolation with diluted alcohol.

Dipterocarpi Balsamum.

GURJUN BALSAM.

Wood Oil.

Origin.—*Dipterocarpus turbinatus*, Gaertner, and other species of the same genus (*Dipterocarpaceæ*).

Habitat.—East India.

Drug used.—The oleo-resin flowing from the wounded tree.

Description.—Thick, oily, opaque, and grayish brown by reflected light, but brown and transparent by transmitted light ; soluble in chloroform, and partially soluble in alcohol, ether, and volatile oils. The solutions show a greenish fluorescence. When heated above 130° C. (266° F.) it gelatinizes and becomes permanently solid. Odor peculiar, balsamic, reminding of copaiba ; taste bitter.

Constituents.—From forty to seventy per cent. of volatile oil, some resin, and gurjunic acid.

Properties and Uses.—Similar to those of copaiba. It has been used with success in *leprosy*, being given internally and applied externally.

Dose.—0.5 to 4 cubic centimeters (8 to 60 minims) in emulsion.

Dita.

DITA.

Ditæ Cortex—Dita Bark.

Origin.—*Alstonia scholaris*, Robert Brown (*Apocynaceæ*).

Habitat.—The Philippines.

Part used.—The bark.

Description.—Thick troughs of various lengths—say from five to twenty centimeters (2 to 8 inches) long, and three to five centimeters (about 1½ to 2 inches) wide. Leather brown, fissured, rough, frequently marked by black spots externally. The inner surface is brownish gray and marked by lines running lengthwise. When broken the bark ap-

FIG. 239.—Dita Bark, natural size.

pears light yellowish internally. The fracture is short, hard ; the powder yellowish gray. Odor, none ; taste, bitterish.

Constituents. — About two per cent of *ditain*, an uncrystallizable, bitter substance ; one-fiftieth per cent. of a bitter alkaloid, *ditamine*, soluble in alcohol ; and another alkaloid soluble in water is also said to have been found.

Medicinal Uses.—This bark resembles Alstonia constricta in its action, but is weaker. It has been used as an antiperiodic in *malarial fever*.

Dose.—Four to fifteen grams (1 to 4 drachms), best given as fluid extract.

DITÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DITA BARK.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Draco.

DRAGON'S BLOOD.

Resina Draconis, Sanguis Draconis—Drachenblut, G.; *Sang-dragon*, F.; *Drakblod*, Sw.

Origin.—*Calamus Draco*, Willdenow (*Palmaceæ*).

Habitat.—Sumatra and Borneo.

Part used.—The resin from the fruit.

Description.—Occurs in sticks or "reeds," and in lumps. That in sticks is of better quality, being cleaner. The external surface is dark reddish-brown ; internally it is of a brighter red. Fracture rough, granular, resinous. Soluble in alcohol, benzol, and chloroform, leaving

about five to twenty per cent. of impurities. Devoid of odor and taste, but when heated it develops the agreeable odor of benzoic acid.

Constituents.—Resin, fixed oil, and cinnamic and benzoic acids.

Uses.—As a coloring matter for plasters, varnishes, tooth-powders, etc. Also occasionally in sealing wax to render it fragrant.

Dracontium.

DRACONTIUM.

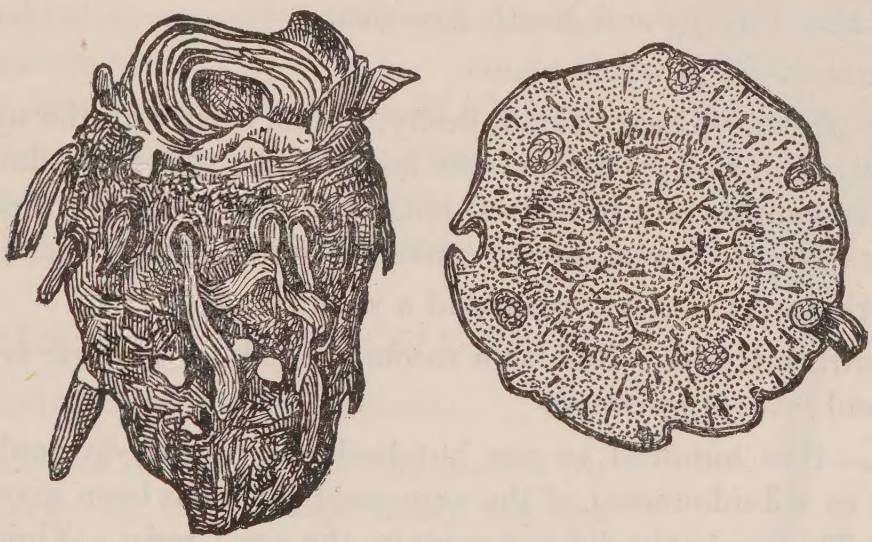
Dracontii Radix—Skunk Cabbage.

Origin.—*Dracontium fœtidum*, Linné (*Araceæ*).

Habitat.—North America.

Part used.—The root.

Description.—From five to ten centimeters (2 to 4 inches) long and about five centimeters (2 inches) thick, grayish-brown externally, and whitish within. Several rootlets are attached to the upper portion



FIGS. 240, 241.—Dracontium, whole and transverse section, natural size.

of the rhizome, but are usually trimmed off in the dried drug. It is usually transversely sliced, or longitudinally quartered as found in the trade. When freshly ground or triturated, the root emits a very disagreeable odor, reminding of the smell of the polecat. The taste is very pungent, acrid.

Constituents.—The principle to which the acridity is due has not been isolated. It seems to be volatile, and is destroyed by heat. The drug also contains resin.

Medicinal Uses.—Antispasmodic. Used in *hysteria*, *chorea*, etc. Externally irritant.

Dose.—0.5 to 4 grams (10 to 60 grains) of the recently dried root.

DRACONTII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DRACONTIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces, use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.5 to 4 cubic centimeters (10 to 60 minims).

Drosera.

DROSERA.

Droseræ Herba, Herba Rorellæ—Sundew.

Origin.—*Drosera rotundifolia*, Linné (*Droseraceæ*).

Habitat.—Europe and North America.

Part used.—The whole plant.

Description.—Leaves small, fleshy, round, bristly on the upper surface, arranged in a circle around the neck of the root ; the flower-stalk is about ten centimeters (4 inches) long, and crowned with a raceme of small white flowers. Inodorous ; taste acidulous, bitter, acrid.

Constituents.—Acrid resin and a peculiar acid.

Medicinal Uses.—Has been recommended for *chronic bronchitis, asthma*, and *whooping-cough*.

Dose.—One hundred to one hundred and twenty-five cubic centimeters (3 to 4 fluidounces) of the expressed juice has been given during the day. This probably did not contain the acrid resin. Fluid extract is the form in which this drug is usually employed, in doses of 0.5 to 1 cubic centimeter (8 to 15 minims).

DROSERÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DROSERA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.25 to 1 cubic centimeter (4 to 15 minims).

Duboisia.

DUBOISIA.

Duboisiæ Folia—Duboisia Leaves.

Origin.— *Duboisia myoporoides*, Robert Brown (*Solanaceæ*).

Habitat.—Australia.

Part used.—The leaves.

Description.—Form and size are shown in the figure. They are smooth and have a short stalk. Odor slight, but disagreeable if any; taste bitter, acrid.

Constituents.—The poisonous alkaloid *duboisine*, chemically related to the *atropine* of belladonna, and producing the same effect on the pupil of the eye (dilatation). Duboisine is twice as soluble in water as atropine. It produces a reddish-brown color with cold concentrated sulphuric acid.

Pitury leaves are the leaves of Duboisia Hopwoodii, containing the same alkaloid and having the same medicinal properties.

Used for the preparation of duboisina.

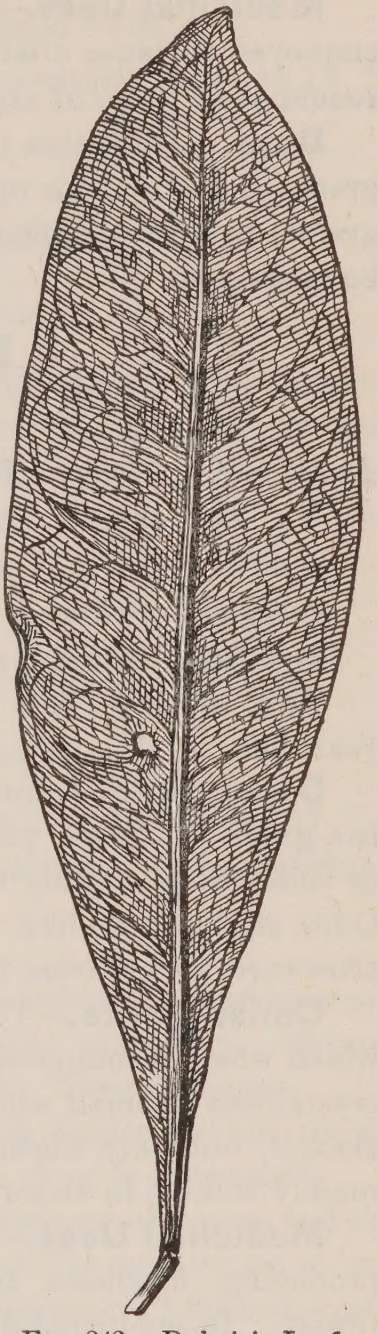


FIG. 242.—Duboisia Leaf.

DUBOISIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF DUBOISIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.05 to 0.30 cubic centimeter (1 to 5 minims).

Duboisinæ Sulphas.

SULPHATE OF DUBOISINE.

A yellowish, soft, gum-like mass, soluble in water. For reactions distinguishing it from atropine sulphate, see above under constituents of duboisia leaves.

Medicinal Uses.—It may be employed in cases in which atropia is employed to cause dilatation of the pupil. Its effects wear off again sooner than those of atropia.

Dose.—Duboisina has been given hypodermically in doses of 0.001 gram ($\frac{1}{60}$ grain) ; for ophthalmological uses a solution of 0.125 gram (2 grains) in fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) of distilled water may be employed.

Dulcamara ; U. S.

DULCAMARA.

Dulcamaræ Stipites—Bittersüss, G.; *Douce amères, Morelle grimpante*, F.; *Dulcamara*, Sp.; *Qvesved*, Sw.; *Bittersweet, Woody Nightshade.*

Origin.—*Solanum Dulcamara*, Linné (*Solanaceæ*).

Habitat.—Europe and North America.

Part used.—The twigs, gathered in the first, second, or third year, and dried.

Description.—Immediately under the thin, yellowish, outer bark is a green (if fresh; yellow, if old) inner bark. The wood is greenish or yellowish according to age. The central pith cavity is usually empty. Odor slight, herb-like. Taste at first bitter, especially of the bark ; afterward sweet, from the wood.

Constituents.—The drug contains a bitter amorphous substance, which when decomposed yields the bitter alkaloid *solanine.* Solanine crystallizes in small white prisms or needles, is readily soluble in boiling alcohol, but only slightly soluble in water. It forms amorphous salts, readily soluble in water and in alcohol.

Medicinal Uses.—In large doses dulcamara is somewhat narcotic, producing dizziness, trembling, and dryness and constriction of the throat. In medicinal doses it does not produce these effects.

This remedy is employed as an alterative diaphoretic in chronic and painful non-syphilitic *skin diseases* and in *chronic rheumatism.* It is of doubtful value.

Dose.—Five to ten grams (75 to 150 grains), best given in the form of fluid extract.

DULCAMARÆ DECOCTUM.

DECOCTION OF DULCAMARA.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See title "Decoctions.")

About the same strength as the preparation of 1870.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms) three times a day.

DULCAMARÆ EXTRACTUM.

Extract of Dulcamara.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown. Yield about twenty per cent.

Dose.—0.35 to 0.65 gram (5 to 10 grains).

DULCAMARÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Dulcamara.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

DULCAMARÆ INFUSUM.

Infusion of Dulcamara.

From fifty grams (or about 1¾ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See title "Infusions.")

About the same strength as the preparation of the British Pharmacopœia.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms).

Elæosacchara.

AROMATIC SUGARS.

These preparations are simply mixtures of powdered sugar with aromatic volatile oils, usually in the proportion of one part volatile oil to fifty parts of sugar. They are made by simple trituration. Aromatic sugars are thus made from the volatile oils of anise, bitter almond, cinnamon, fennel, etc.

Uses.—For flavoring powders.

Elaterinum; U. S.

ELATERIN.

Origin.—*Ecballium Elaterium*, A. Richard (*Cucurbitaceæ*).

Habitat.—Europe; cultivated.

Character, Description, and Tests.—See the Pharmacopœia (1880), page 92. This is a colorless, crystalline, chemically indifferent substance extracted from *Elaterium* (see Elaterium). *Elaterin*—now for the first time official in the U. S. Pharmacopœia—is several times stronger therapeutically than the formerly official *Elaterium*, which has been expunged on account of its variable character.

Great care should be exercised in writing, reading, and dispensing prescriptions for ELATERIUM *and for* ELATERINUM, *in order that the two may not be confounded on account of the similarity of their names.*

The elaterin consists of small shining crystals; odorless; intensely bitter, and acrid. Readily soluble in chloroform, fusel oil, or in bisulphide of carbon.

Medicinal Uses.—Same as those of Elaterium. Violently purgative.

Dose.—Elaterin being stronger should be given in doses not exceeding 0.004 gram ($\frac{1}{16}$ grain) at first, to be increased only as occasion requires. It is usually given in pill, and the tendency to gripe may be overcome by combination with hyoscyamus.

ELATERINI TRITURATIO; U. S.

TRITURATION OF ELATERIN.

Prepared by triturating nine grams (139 grains) sugar of milk, in moderately fine powder, together with one gram (15$\frac{1}{3}$ grains) elaterin, until the mixture is reduced to a very fine powder and the whole intimately mixed.

This is the only representative in the Pharmacopœia of the new class

of preparations introduced under the name of "Triturations" (see that title).

The elaterin itself is so powerfully active and its dose so minute that the above-described preparation becomes a very useful and safe dilution of it.

Dose.—0.03 to 0.04 gram ($\frac{1}{2}$ to $\frac{2}{3}$ grain).

Elaterium.

ELATERIUM.

Origin.—*Ecballium Elaterium*, A. Richard (*Cucurbitaceæ*).

Habitat.—Europe; cultivated.

Description.—This is a peculiar resinous substance obtained from the fresh juice of the fruit of *Ecballium Elaterium* ("squirting cucumber").

The juice is clear when fresh from the fruit, but soon becomes turbid from the *elaterium* which deposits from it. The deposit is collected on muslin, and dried as rapidly as possible, and then constitutes the drug.

Elaterium comes in flat pieces of variable thickness (from $\frac{1}{16}$ to $\frac{3}{16}$ inch, about) and irregular size (usually averaging less than $\frac{3}{4}$ inch long by about $\frac{3}{8}$ inch wide). When fresh the pieces have a dull, pale-green color; when older gray, or even buff; and sometimes showing minute crystals on the surface. On one side they show the imprint of the cloth on which the elaterium was dried. They are dry, light in weight, and easily broken. No odor; taste very acrid and bitter.

Must not be confounded with the several times stronger elaterin (see "Elaterinum").

On account of its variable quality, this elaterium has been expunged from the U. S. Pharmacopœia, and the more reliable and uniform *elaterin* introduced in its place.

Constituents.—The only important constituent in elaterium, and the one to which it owes its medicinal properties, is *elaterin*, which has now taken its place in the Pharmacopœia. Elaterium contains from fifteen to forty per cent. of the elaterin, the average being about thirty per cent. The elaterin may be extracted by means of chloroform, and precipitated from its solution in that solvent by the addition of ether, in which it is nearly insoluble. The yield in crystals ought not to be less than one-fourth the weight of the elaterium treated with the chloroform.

Sometimes elaterium has been found adulterated with chalk or with starch. If it contains chalk it will effervesce with acids. If it contains starch, a little water boiled with a small quantity of the drug will strike a blue color on the addition of a drop of compound solution of iodine.

English elaterium is deemed to be the best ("Clutterbuck's"). German elaterium is a dark, extract-like mass obtained by evaporating the forcibly expressed juice of the fruit.

Medicinal Uses.—It is a powerful hydragogue cathartic, its action being often accompanied by vomiting and griping.

It is used only to produce profuse watery discharges, as in *dropsies* or threatened *cerebral congestion*, or in *œdema of the lungs*. Its best effects are noticed in *abdominal dropsy*.

It must be used cautiously.

Dose.—0.008 to 0.015 gram ($\frac{1}{8}$ to $\frac{1}{4}$ grain).

Electuaria.

ELECTUARIES.

These are confections of a consistence resembling that of thick honey, or thick enough to be retained in a jar when inverted. They are made by mixing dry medicinal powders with honey or syrup. (See "Confectiones.")

Elemi.

ELEMI.

Elemi Oleo-resina.

Origin.—*Canarium commune*, Linné (*Burseraceæ*).

Habitat.—Philippine Islands.

Drug.—The oleo-resin flowing from the wounded tree.

Description.—A yellowish resinous mass, resembling in appearance thick granular honey; when old it becomes more solid, friable. The odor is balsamic, reminding of a mixture of turpentine, fennel, and lemon. The taste is pungent and bitter.

Constituents.—About ten per cent. volatile oil, sixty per cent. amorphous resin (brëin), and twenty-five per cent. crystallizable resin (amyrin), besides *bryoidin*, which is a crystallizable, bitter, acrid substance, brëidin, and elemic acid.

Properties.—Stimulant, irritant. Used only in plasters and ointments.

ELEMI UNGUENTUM.

OINTMENT OF ELEMI.

Mix intimately equal parts, by weight, of elemi, Venice turpentine, suet, and lard.

Elixiria.

ELIXIRS.

A recently introduced class of preparations which cannot be said to form a well-defined group pharmaceutically. However, the general interpretation of the term "elixir" is that it is an agreeably flavored liquid preparation in which the odor and taste of the medicinally active ingredients are sufficiently masked to render the preparation comparatively palatable, the bulk of the liquid consisting of alcohol (12 to 25 per cent.), water, and sugar (25 to 35 per cent.). Among the elixirs most used are such as contain preparations of iron, the cinchona alkaloids, bismuth-ammonium citrate, strychnine, pepsin, ammonium valerianate, potassium bromide, etc., etc. Many of the elixirs on the market are not only badly made, but do not deserve the name *elixir* at all, being, if possible, more disagreeable to take than the active constituents in a simpler form would be. Other elixirs have been found not to contain the medicines indicated on the labels. It is, therefore, not surprising that these preparations, as a class, have met with sweeping condemnation from conscientious physicians and pharmacists. When well and properly made, however, we regard the elixirs as reliable, efficient, and useful. In an appendix on page 1139 we give a series of excellent formulæ for the principal elixirs in use.

Emplastra.

PLASTERS.

Pflaster, G.; *Emplâtres*, F.; *Plåster*, Sw.

Solid compounds of a pliable, tenacious consistence, insoluble in water, and suitable for covering limited areas of the surface of the body. They are usually prepared from oleate of lead (lead plaster), resins, wax, etc., with which more active constituents are frequently incorporated, such as cantharides, mercury, narcotic extracts, etc.

Plasters must be perfectly smooth and homogeneous. They soften in contact with the warm surface of the body.

It requires from eight to twelve grams (2 to 3 drachms) plaster to cover one hundred square centimeters (20 square inches, or 4 × 5 inches) of surface. Plasters are usually spread on chamois skin, kid skin, or muslin.

Adhesive plaster is spread on muslin. Isinglass plaster is spread on silk or on muslin, and is not a "plaster" in the proper sense.

Emulsiones.

EMULSIONS.

Emulsions are liquid preparations in which oil, oleo-resin, balsam, or resin is suspended in water by the aid of some viscid excipient. The Pharmacopœia makes no distinction between mixtures and emulsions, although a great practical difference exists. We have an example of the preparations properly termed "mixtures" in the official *mistura cretæ composita*, in which chalk is suspended in the liquid.

Emulsions have been divided into two kinds, the so-called *emulsiones veræ*, or true emulsions, and the *emulsiones spuriæ*, or false emulsions. The distinction is based on a difference in the materials used.

The true emulsion is one in which both the oily or resinous and the mucilaginous substances are combined in the drug, as in *mistura asafœtidæ*, *mistura amygdalæ*, or *mistura ammoniaci*. The drug is simply triturated in a mortar with water, and the emulsion thus directly obtained.

The false emulsion, called *colostrum* by some of the older writers, is made by adding gum or yelk of egg, or some other similar emulsifying agent, to the oily or resinous substance, as we see in emulsions of castor-oil or copaiba.

Different methods of manipulation have been employed. To shake the oil and mucilage together in a vial makes a poor emulsion. To rub the gum-arabic in a mortar with not exceeding one and one-half times its own weight in water, and then add the oil gradually, is also likely to produce unsatisfactory results. Experience leads us to recommend the following method as by far the best :

Add the oil, oleo-resin or balsam, to a quantity of powdered acacia as given in the table below, mixing both well in a wedgewood mortar at least five or six inches in diameter, to permit free movement of the pestle. When the two are mixed add water equal to half the weight of both the oil and acacia, and then triturate rapidly and without cessation until the emulsion is perfectly homogeneous and white. Then slowly add the remainder of the water, stirring continually, and finally the other ingredients.

The proportions which will most surely and uniformly give good results are as follows :

	Oil.	Gum.	Water.
Fixed oils or copaiba	1	½	¾
Oil of turpentine	1	1	1
Peruvian balsam	1	2	1½

The figures express parts by weight. The quantity of water is ascertained in each case by adding the quantities of gum and oil together and dividing by two.

For instance, to emulsify thirty grams copaiba we require fifteen grams of powdered acacia, which is placed in the mortar, and the copaiba is added carefully to prevent it from being smeared over the sides of the mortar or pestle. [Any part of the oil not mixed with the gum will probably be found swimming on top in the finished preparation.] Then twenty-four grams of water is added, and the three ingredients thoroughly mixed. The balance of the water is then gradually added.

The quantity of finished emulsion should not be more than six or eight times that of the oil. Alcoholic tinctures in large quantities should not be added to emulsions, but syrups improve the taste of these preparations.

Dark-colored fluid extracts make unsightly mixtures with emulsions, which look best when perfectly white. Sometimes they are flavored, and at the same time colored with compound spirits of lavender or compound tincture of cardamom.

We may use one yelk of egg instead of fifteen grams of gum-arabic and make good emulsions. This excipient is perhaps best adapted to emulsion of cod-liver oil, but the preparation cannot be kept long.

Chloroform may be given in a most pleasant form by mixing it with twice or three times its own weight of sweet almond oil, and then making an emulsion of the oil precisely as if no chloroform were present. The emulsion may be flavored with syrup according to taste.

One gram of glyconin emulsifies three grams of fixed oil.

Emulsions made by adding alkaline chemicals are not really emulsions but solutions of soaps, and should not be employed when emulsions are ordered. In emulsions the oil undergoes no chemical change whatever, but is merely mechanically suspended, like butter in milk. Under the microscope we can readily see the oil globules. A well-made emulsion should not separate into oil and water even after long standing, but only into a creamy and a serous layer, just as in fresh milk. We have prepared an emulsion and have kept it for over five years, and even at the end of that time the emulsion was still perfect as far as the suspension of the oil was concerned. Of course an emulsion may spoil by fermentation or by the oil becoming rancid, but it should remain an emulsion.

All emulsions not specially prepared so as to keep indefinitely ought to be freshly made whenever prescribed.

Enemata.

ENEMAS.

Clysters, Injections, E.; *Klystiere*, G.; *Lavements, Clystères*, F.; *Lavemanger, Klistirer*, Sw.

Injections for the rectum. Always prepared extemporaneously, and rarely by the pharmacist. Decoctions of starch, barley, or oats, are often used, the medicaments, if any, being added to them. A few specimens of injections in common use are given under the respective titles of the materials from which they are made.

Demulcent enemas are used in irritated conditions of the bowel, in tenesmus, etc., and consist generally of decoction of starch with or without opiates.

Laxative enemas are generally watery solutions of laxative remedies, or mixtures of castor-oil, soap-suds, etc. Cold water injections are valuable in chronic constipation. Large enemas of any kind are usually laxative, for even if they contain no cathartic remedies, the mechanical distention of the lower bowel causes contraction and consequent expulsion of the contents of the rectum. If the enema shall be retained it should not, as a rule, be more than twenty-five to one hundred cubic centimeters (6 to 24 fluidrachms).

Nutritive enemas consist of nourishing substances, as defibrinated blood, eggs, milk, chopped beef, etc.

A very good form of nutritive enema is prepared by mixing finely divided lean beef and clean pancreas in the proportions of four hundred and fifty grams (1 pound) of the former to one hundred and fifty grams ($\frac{1}{3}$ pound) of the latter. The bowel is to be cleaned by an injection in the morning and then the above mixture is injected in several doses during the day.

Stimulant enemas are sometimes of use in collapse, typhoid conditions, extreme debility, etc. Beef-tea and beef-broth enemas are simply stimulant and not nutritive. Warm toddies, diluted brandy, and similar substances are sometimes used in this manner.

Vermifuge enemas consist of solutions of anthelmintics, as aloës, santonin, salt, etc., mainly for the removal of thread-worms from the rectum.

Enemas are sometimes used simply as washes to cleanse the bowel in dysentery or fissure of the anus.

Epigæa.

EPIGÆA.

Epigææ Folia—Trailing Arbutus, Gravel Plant.

Origin.—*Epigæa repens*, Linné (*Ericaceæ*).

Habitat.—North America.

Part used.—The leaves.

Description.—Green, bristly, entire, cordate-ovate. Odorless, astringent, bitter.

Constituents.—Tannin from three to four per cent., besides *arbutin*, ursone, etc., also found in Uva Ursi, which see.

Medicinal Uses.—Similar to those in Uva Ursi. Used in *vesical catarrh*, etc.

Dose.—Two to eight grams ($\frac{1}{2}$ to 2 drachms) in infusion or fluid extract.

EPIGÆÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF EPIGÆA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

Equisetum.

EQUISETUM.

Equiseti Herba—Schachtelhalm, G.; *Prêle*, F.; *Horse-tail, Scouring Rush.*

Origin.—*Equisetum arvense*, Linné, and *Equisetum hyemale*, Linné (*Equisetaceæ*).

Habitat.—Europe and North America.

Part used.—The stems.

Description.—Simple, long, slender, bright green, harsh to the feel, jointed, about sixty centimeters (2 feet) long, and four millimeters ($\frac{1}{6}$ inch) in diameter.

Constituents.—The ash contains silica in large quantity. This is the substance which renders the "horse-tail" so rough and so useful for

scouring metallic vessels. The plant also contains resin, which is the only medicinal constituent.

Medicinal Uses.—Diuretic and astringent. Has been employed in *renal affections*, *dropsy*, etc. The pulverized ashes have been used in *dyspepsia*.

Dose.—Five grams (75 grains) in infusion during the day.

Ergota; U. S.

ERGOT.

Secale Cornutum—Mutterkorn, *Kornmutter*, *Zapfenkorn*, G.; *Ergot*, *Seigle Ergoté*, *Blé cornu*, F.; *Cornezuelo del centeno*, *Centeno de Cornezuelo*, Sp.; *Mjöldryga*, Sw.; *Ergot of Rye*, *Spurred Rye*.

Origin.—*Claviceps purpurea*, Tulasne (*Fungi*).

Habitat.—Southern Europe, etc. Large quantities are imported from Spain and from Southern Russia.

Part used.—The sclerotium (compact spawn), or middle (second) stage of development of the fungus, which grows within the flower of the common rye (secale cereale, Linné) displacing the grain.

There are ergot growths on several kinds of grasses besides rye. The only official kind, however, is the ergot of rye.

Description.—See the Pharmacopœia, pages 98 and 99.

Ergot consists of grain-like bodies about one to two inches long and one-eighth to one-sixth inch thick. The ordinary size of fair ergot is about one inch long and one-eighth inch thick. The grains are nearly triangular, somewhat curved, marked lengthwise by three grooves, of which the one on the inner side of the curve is the most distinct. The grains are thickest about the middle, tapering toward both ends, which are blunt. On the outside they are of a very dark purplish color, with a slight coating of a cloudy bluish bloom. They should be full, firm, and somewhat elastic, but are easily broken. The broken surface is even, whitish toward the center, but has, in a good drug, a pinkish tint increasing toward the circumference. Sometimes the grains are transversely superficially cracked. The drug has a peculiar, offensive, rancid, heavy odor ; and a fatty, mawkish, disagreeable taste. The strong odor developed when ergot is triturated with solution of potassa reminds of herring brine, and is probably due to trimethylamine.

FIG. 243.—Ergot, natural size.

The ergot grains are very close and tough, not easily penetrated by water, and difficult to powder.

This drug is frequently attacked by mites. To prevent this, and to preserve its medicinal activity, it should be carefully dried at not above 50° C. (122° F.) before putting it away, and is best kept in well-covered tin cans. It is also advisable to put a few drops of chloroform in with it.

The stock must be renewed every year. It is collected in August.

Powdered ergot soon loses its medicinal activity, and should therefore never be kept in stock except for a very brief period. Best is to powder it in an iron mortar.

Much broken, small, lean, unclean, worm-eaten, mouldy, or too hard and dry ergot is totally unfit for use ; also a drug having an ammoniacal odor, or one having no odor at all.

Constituents.—Two alkaloids—*ecbolina* (0.16 per cent.), and *ergotina* (0.12 per cent.)—have been described as isolated from ergot. The former has been stated to be much more active medicinally than the latter, which is said not to produce the characteristic effects of the drug —contractions of the muscles. They were both described as brown, amorphous, feebly bitter substances having an alkaline reaction, and readily soluble in water and alcohol, and insoluble in ether. The probability is that they are both one and the same thing.

There is also about thirty per cent. of non-drying fixed oil, and seven per cent. resin in ergot.

A number of uncrystallizable compounds have been obtained in treating the drug with chemicals. Most of them, perhaps (including *ecboline* and *ergotine*) do not exist naturally in ergot, but are formed by the action of the chemicals, the heat employed, etc.

Since the investigations of Dragendorff and Podwissotzky it is doubted whether *ecbolina*, to which the activity of ergot was formerly ascribed (at least in great part), itself possesses the properties of the drug. The chemists named obtained four to four and one-half per cent. *sclerotic acid*, and two to three per cent. *scleromucin*, which have been used medicinally and are active ecbolics. Sclerotic acid is an amorphous, yellowish-brown, inodorous, tasteless substance, soluble in water ; scleromucin is darker in color and insoluble in water after drying.

Sclererythrin is also an active constituent of ergot.

The fixed oil has no medicinal properties. It may be extracted with ether.

The *ergotin* of Wiggers is simply an alcoholic extract of ergot ; while the *ergotin* of Bonjean is an aqueous extract precipitated by alcohol. Both are active preparations notwithstanding the opposite methods of preparation. The *ergotin* manufactured by various pharmaceutical chemists in this country is usually an extract obtained by evap-

orating the fluid extract to the proper consistence. It is now official under the name of Extractum Ergotæ, which see.

Other Ergots.—Wheat ergot is shorter and thicker, and oat ergot much more slender than the ergot of rye. The ergot growing on *Arundo ampelodesmos*, a grass of Northern Africa, is from one to four inches long but extremely slender ; it has been tried in France and said to be twice as active as the ergot of rye.

Medicinal Uses.—Ergot belongs to the class of medicines known as spinants or excito-motors. The principal and most valuable effect of ergot is its stimulating action on the vaso-motor nervous system, causing contraction of unstriped or involuntary muscular fibre, as of the arterioles, the sphincter muscles, the womb, etc. After excessive doses this contraction extends to all the muscles, respiration becomes labored on account of tetanic contraction of the diaphragm and respiratory muscles ; opisthotonus, tetanic spasms, delirium, insensibility, and even death may occur. In pregnant females abortion may result.

The most important use of ergot is in midwifery practice, when it is given for the purpose of causing contraction of the uterus ; but it must be recollected that the pains become longer in duration and more tetanic, and large doses may produce a continuous expulsive pain that may injure the child.

The use of this drug is indicated in *inertia uteri*, when the want of progress of labor is not due to any obstruction but to an atonic condition of the womb. It is counter-indicated in cases of rigid os or rigid perineum, pelvic tumors or exostoses, deformed pelvis, etc., for if used under such circumstances death of the fœtus from continued pressure, and of the mother from rupture of the uterus, may result.

Ergot is also given in the last stage of labor to prevent *post-partum hemorrhage.*

This drug is also useful in *hemorrhages, hæmoptysis, hæmaturia, uterine hemorrhages, menorrhagia, bleeding hemorrhoids,* etc.; or in threatened *hemorrhage in the brain* or *lungs ;* in *aneurism,* internally, or injected into the tissues adjacent to the lesion ; in *spermatorrhœa, paralysis of the bladder, incontinence of urine, prolapse of the rectum, uterine fibroids* and *polypi, congestion of the brain* or *spinal cord, cerebro-spinal meningitis,* and in various mental diseases, especially such as *recurrent, chronic,* and *epileptic mania.*

Ergot is also used in large doses in the treatment of *incipient diabetes.*

In all cases when prompt action is desirable, this remedy may be given in hypodermic injection, for which purpose the extractum ergotæ is generally employed.

Dose.—Varies from one or two grams (15 to 30 grains) up to thirty grams (1 ounce), according to indications or urgency. The remedy may be given in powder, or the powder may be steeped in hot water and the infusion swallowed without straining, as soon as it is cool enough.

But by far the best form for administration is the fluid extract.

ERGOTÆ EXTRACTUM; U. S.

Extract of Ergot.

Ergotin.

Evaporate one hundred and fifty grams (about 5 ounces) of the official fluid extract of ergot on a water-bath at not above 50° C. (122° F.), stirring constantly until thirty grams (about 1 ounce) only remains.

New to the U. S. Pharmacopœia.

It will be observed that unless the fluid extract is in every way reliable the above process must yield an unsatisfactory product. The official fluid extract, made with the specified menstruum, is the only one that can be used; and even then the resulting solid extract will not be a proper one unless the fluid extract was made with such care as to contain the full amount of soluble matter.

When well made this extract is five times the strength of the powdered ergot. It is reddish brown.

Dose.—0.5 to 1 gram (8 to 15 grains). It may be dissolved in water and used for subcutaneous injection.

ERGOTÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Ergot.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every four hundred grams (about 13½ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 5¼ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Add thirty grams (about 1$\frac{1}{16}$ avoirdupois ounce) diluted hydrochloric acid to the *second percolate.*

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to thirty cubic centimeters (½ to 1 fluidounce).

Fluid extract of ergot is one of the most important preparations in the whole Materia Medica list. In order to be reliable and uniform it must be prepared with great care from freshly powdered drug of good quality. The menstruum chosen in the new Pharmacopœia is decidedly better than that of the Pharmacopœia of 1870. Hydrochloric acid insures the chemical stability of the active constituents much better than the acetic acid formerly used. The use of glycerin in the old menstruum could not possibly have fulfilled any useful office, but simply made the preparation thicker and heavier. The new menstruum might, however, with greater safety and better results be less strongly alcoholic, as one of the important active constituents of the drug (scleromucin) is liable otherwise to be at least partially precipitated. When the fluid extract of ergot is comparatively old it is liable to acquire a strong trimethylamine odor and a nauseous rancid taste, especially when the menstruum used is not the proper one. Good fluid extract of ergot contains all the sclerotic acid, scleromucin, and sclererythrin of the drug, and has a reddish-brown color.

ERGOTÆ INFUSUM.

Infusion of Ergot.

From fifteen grams (or about ½ avoirdupois ounce) of the drug, in coarse powder, make five hundred grams (equal to about 17 U. S. fluidounces). (See directions under title "Infusa.")

A trifle stronger than the preparation of the British Pharmacopœia, which is one-fourth avoirdupois ounce to ten imperial fluidounces.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms) or more.

ERGOTÆ LIQUOR.

Liquor of Ergot.

Macerate ninety grams (3 ounces) ergot, in coarse powder, with two hundred and forty cubic centimeters (8 fluidounces) water for twelve hours; then add one hundred and twenty cubic centimeters (4 fluidounces) alcohol, and continue the maceration for ten days.

Express and filter.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms) or more.

ERGOTÆ TINCTURA.

TINCTURE OF ERGOT.

Moisten one hundred and twenty grams (4 ounces) coarsely powdered ergot with forty-five cubic centimeters (1½ fluidounce) of a mixture of equal parts by measure of diluted alcohol and water; pack it tightly in a cylindrical percolator and percolate with the same menstruum as before until four hundred and eighty cubic centimeters (16 fluidounces) of tincture has been obtained.

Dose.—Two to fifteen cubic centimeters (½ to 4 fluidrachms). It is not a good form for administration of this drug on account of the large proportion of alcohol.

ERGOTÆ VINUM; U. S.

WINE OF ERGOT.

Moisten forty-five grams (1½ ounce) recently ground ergot, in No. 30 powder, with fifteen cubic centimeters (½ fluidounce) stronger white wine; pack it moderately in a cylindrical percolator, and percolate with stronger white wine until three hundred cubic centimeters (10 fluidounces) of percolate has been received.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Erigeron.

ERIGERON.

Erigerontis Herba—Fleabane, Scabious, Canada Fleabane, Squaw-weed.

Origin.—*Erigeron canadense*, Linné; *Erigeron Philadelphicum*, Linné; *Erigeron annuum*, Persoon; and *Erigeron strigosum*, Muhlenberg (*Compositæ*).

Habitat.—North America.

Part used.—The whole flowering plants.

Description.—The leaves are hairy. The ray-florets purplish or white; disk-florets yellow. Odor somewhat disagreeably aromatic; taste bitter, astringent.

Constituents.—A trace of volatile oil, tannin, and bitter extractive.

Medicinal Uses.—Slightly tonic, diuretic, and astringent. Has been used in *nephritic troubles*, *dropsies*, etc.

Dose.—Five to ten grams (1 to 2½ drachms) in infusion or fluid extract.

ERIGERONTIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ERIGERON.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Erigerontis Oleum; U. S.

OIL OF ERIGERON.

Erigerontis Ætheroleum—Volatile Oil of Erigeron Canadense, Oil of Fleabane.

Description.—See the Pharmacopœia, page 236. It does not keep well, soon becoming resinified and unclear.

Has been used to arrest *post-partum* and *uterine hemorrhages* in doses of 0.25 to 0.5 cubic centimeter (4 to 8 minims).

Eriodictyon.

ERIODICTYON.

Eriodictyi Folia—"Yerba Santa."

Origin.—*Eriodictyon glutinosum*, Bentham (*Hydrophyllaceæ*).

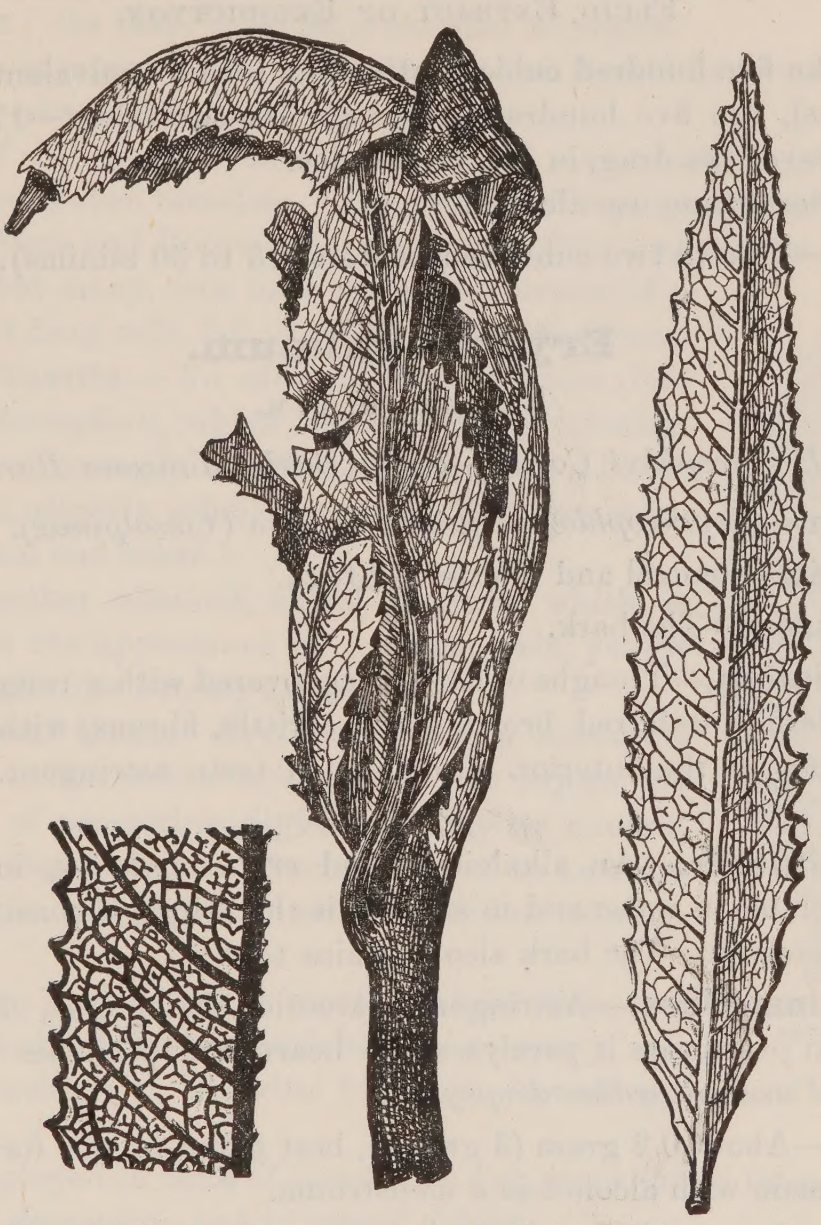
Habitat.—California.

Part used.—Leaves.

Description.—From five to ten centimeters (2 to 4 inches) long, formed as seen in the figure; green, smooth, shining as if varnished on the upper surface; net-veined and white-hairy on the under surface. Often comes into the trade in agglutinated masses, as shown in the figure. Odor fragrant; taste aromatic, sweetish.

Constituents.—Acrid resin and a small quantity of an aromatic volatile oil.

Medicinal Uses.—Used as a stimulant of the mucous membranes of the bronchial tubes in *chronic bronchitis*, *consumption*, etc.



FIGS. 244–246.—Eriodictyon Leaves, as in crude drug; and lower surface of leaf after softening and removing the resin by soaking in warm soda lye, natural size; also part of leaf, showing venation, enlarged.

Dose.—One to two grams (15 to 30 grains), best given as fluid extract.

ERIODICTYI EXTRACTUM.

EXTRACT OF ERIODICTYON.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Greenish brown.

Dose.—0.10 to 0.50 gram (2 to 8 grains).

ERIODICTYI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ERIODICTYON.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

Erythrophlœum.

ERYTHROPHLŒUM.

Erythrophlœi Cortex—Sassy Bark, Mancona Bark.

Origin.—*Erythrophlœum guineense*, Don (*Cæsalpineæ*).

Habitat.—Central and Western Africa.

Part used.—The bark.

Description.—Troughs or flat pieces covered with a rough, fissured, corky epidermis, dull red brown, hard, brittle, fibrous, with yellowish-brown spots in the interior. Inodorous; taste astringent. Powder irritating.

Constituents.—An alkaloid called *erythrophlœine*, in colorless crystals, soluble in water and in alcohol, is the principal constituent, and is very poisonous. The bark also contains tannin.

Medicinal Uses.—Astringent, narcotic, cholagogue, diaphoretic, emetic. In overdoses it paralyses the heart and produces death. It has been of use in *cardiac dropsy*, etc.

Dose.—About 0.2 gram (3 grains), best given in the form of fluid extract; made with alcohol as a menstruum.

Erythroxylon; U. S.

ERYTHROXYLON.

Erythroxyli Folia—Coca Leaves, Cucha Leaves.

Origin.—*Erythroxylon Coca*, Lamarck (*Erythroxylaceæ*).

Habitat.—Peru.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 99.

They are from thirty-five to seventy-five millimeters (1½ to 3 inches) long, closely net-veined on both sides, with a thick midrib, on each side of which runs a curved line from the pointed base to the blunt point of

the leaf. The odor is pleasant, tea-like, when the drug is good ; but most of the drug met with in the market has the usual faint odor of dried leaves ; the taste is bitter, somewhat aromatic.

The leaves must be green, not brown, and should have an appreciable tea-like odor and aromatic taste.

Much of the coca sold in this country is very much discolored, and is odorless and even tasteless. The remarkable properties of the drug as used in Peru and Bolivia are as well established as are the properties of coffee ; but many, who have tested the virtues of a deteriorated drug only, fail to obtain its proper effects.

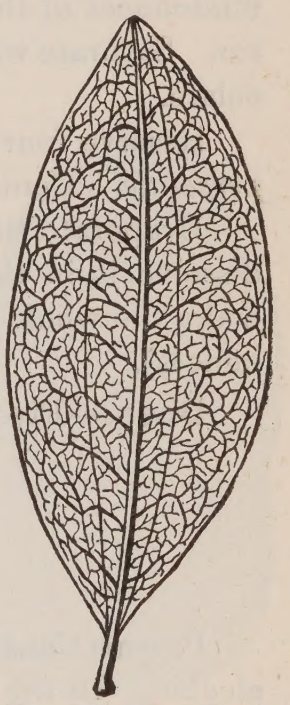


FIG. 247.—Coca Leaf, natural size.

Constituents.—An alkaloid called *cocaine* (formerly *erythroxyline*), which crystallizes in colorless prisms, has a strongly alkaline reaction, and a bitter taste, is but slightly soluble in water, but more soluble in alcohol and ether.

Also another alkaloid, called *hygrine*, which is volatile, has the appearance of a thick, pale, yellow oil, and smells like herring brine.

Medicinal Uses.—Erythroxylon is a stimulant resembling coffee or tea in its action. It enjoys the reputation of promoting digestion, allaying hunger, preventing tissue waste, and enabling one to undergo much fatigue and exposure with insufficient nourishment.

It is also said to cause mental exhilaration, and to overcome diffidence or bashfulness in company, and to be an excitant of the vital functions, including those of the sexual organs.

It is employed in cases of inordinate *hunger* or *thirst*, in *melancholia* and *mental depression*, and in *sexual debility*.

Dose.—Four to fifteen grams (1 to 4 drachms) chewed, or in the form of fluid extract.

ERYTHROXYLI EXTRACTUM.

Extract of Erythroxylon.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.20 to 1 gram (3 to 15 grains).

ERYTHROXYLI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Erythroxylon.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred and twenty-five grams (about 8½ fluidounces of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Essentiæ.

Essences.

Preparations named *essences* are usually solutions of volatile oils in alcohol. In the British Pharmacopœia there are two of them, and these are stronger than the "spirits," which are also mostly solutions of volatile oils in alcohol.

Ethyl Bromidum.

Ethyl Bromide.

Hydrobromic Ether.

A clear, colorless, volatile, ethereal liquid, of pleasant odor, and hot, sweetish taste. It is not inflammable. Its specific gravity is 1.42, and the boiling-point 40° to 41° C. (104° to 105.8° F.). Mixes with alcohol or ether, but not with water. Should evaporate without leaving any residue or stain, but only a slight amount of moisture.

Properties and Uses.—Recommended by Drs. Turnbull and Levis, of Philadelphia, as a safe, speedy anæsthetic. Said to be quite as safe as ether, and more so than chloroform. Recent experiments, however, show that it paralyzes the respiratory centers when injected into the jugular vein of a rabbit.

Eucalyptus; U. S.

EUCALYPTUS.

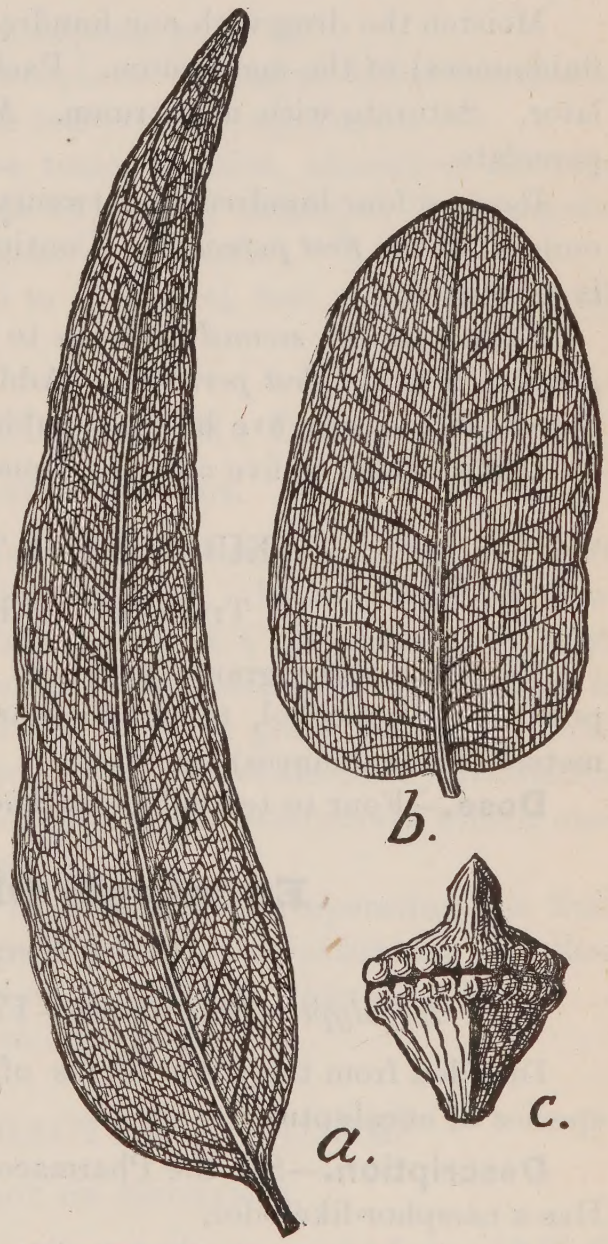
Eucalypti Folia—Eucalyptus Leaves.

Origin.—*Eucalyptus globulus*, Labillardière (*Myrtaceæ*).

Habitat.—Australia; cultivated in California, etc.

Part used.—The leaves, collected from old trees.

Description.—See the Pharmacopœia, page 99. Leaves from old trees are thick, long, pointed; those of younger trees are shorter, broader, blunt, thinner, bluish green, and less aromatic. Both are here illustrated.



FIGS. 248–250.—Eucalyptus. *a*, second year's leaf, half size; *b*, first year's leaf, half size; *c*, unexpanded flower, natural size.

Constituents.—Volatile oil. There is also a crystallizable resin in eucalyptus, and some tannin.

Medicinal Uses.—Eucalyptus trees are said to render marshy and malarial districts inhabitable, which effect has been variously ascribed to an exhalation of ozone or eucalyptol from the leaves, or to the drainage of the soil on account of the exhalation of water from the leaves, which is said to be equal to ten times the weight of the tree in each twenty-four hours.

Eucalyptus is a stimulant tonic and stomachic, increasing the appetite and digestion, and also, to a certain extent, the intestinal secretions. Useful in *dyspepsia* and *gastric catarrh*.

It is also blennorrhetic, diaphoretic, and diuretic, and is therefore of value in *purulent catarrh* of the bronchial membranes, *chronic catarrh of the bladder*, etc.

Eucalyptus has been used internally in *intermittens*.

Dose.—One to five grams (15 to 75 grains), best in the form of fluid extract.

EUCALYPTI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF EUCALYPTUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and seventy-five grams (about 7⅓ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to five cubic centimeters (15 to 75 minims).

EUCALYPTI TINCTURA.

TINCTURE OF EUCALYPTUS.

Percolate sixty grams (2 ounces 50 grains) eucalyptus, in No. 30 powder, with alcohol, to obtain four hundred and seventy cubic centimeters (16 fluidounces) tincture.

Dose.—Four to ten cubic centimeters (1 to 2½ fluidrachms).

Eucalypti Oleum; U. S.

OIL OF EUCALYPTUS.

Eucalypti Ætheroleum—Volatile Oil of Eucalyptus.

Distilled from the *fresh* leaves of *Eucalyptus globulus,* and other species of eucalyptus.

Description.—See the Pharmacopœia, page 236. Pale yellowish. Has a camphor-like odor.

Medicinal Uses.—Employed as an antiseptic in surgical dressings to *gangrenous* or *foul ulcerating sores.* Internally in *gangrene* and *septic diseases.* As an inhalation in *bronchorrhœa,* or *gangrene of the lungs.* As a deodorizer of hospital wards and also of the hands to remove the smell of the cadaver after dissecting or making post-mortem examinations.

Dose.—0.1 to 0.3 cubic centimeter (2 to 5 minims).

Euonymus; U. S.

EUONYMUS.

Euonymi Cortex— Wahoo Bark.

Origin.—*Euonymus atropurpureus*, Jacquin (*Celastraceæ*).

Habitat.—United States.

Part used.—The bark.

Description.—See the Pharmacopœia, page 99.

Constituents.—A bitter, amorphous substance called *euonymin*, crystallizable *euonic acid*, *resinous matters*, and *asparagin*.

Medicinal Uses.—Said to be tonic, laxative, alterative, diuretic, and expectorant. Its preparations have been employed in *dyspepsia*, *constipation*, *dropsy*, and in *pulmonary affections*.

Dose.—One to five grams (15 to 75 grains), best given in the form of fluid extract.

EUONYMI EXTRACTUM; U. S.

EXTRACT OF EUONYMUS.

Take five hundred grams (17⅔ avoirdupois ounces) of drug, in No. 30 powder. As a menstruum use diluted alcohol. Moisten with two hundred grams (7½ fluidounces). Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate to exhaustion, or until one thousand five hundred grams (about 56 fluidounces) percolate has been received. Recover the alcohol by distillation as usual. Then evaporate to solid extract and incorporate with it one-twentieth of its weight of glycerin.

Practically the same product is obtained by evaporating the fluid extract, prepared as directed below, to the proper consistence and then adding five per cent. glycerin. New to the U. S. Pharmacopœia.

Dose.—0.05 to 0.30 gram (1 to 5 grains).

EUONYMI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF EUONYMUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—One to five cubic centimeters (15 to 75 minims).

Eupatorium; U. S.

EUPATORIUM.

Eupatorii Perfoliati Herba—Boneset, Thoroughwort.

Origin.—*Eupatorium perfoliatum*, Linné (*Compositæ*).

Habitat.—North America.

Parts used.—The leaves and flowering tops.

Description.—See the Pharmacopœia, page 99.

Constituents.—A bitter neutral principle called *eupatorin*, some *volatile oil*, tannin, etc.

Medicinal Uses.—Eupatorium is a bitter tonic useful in *intermittent fever*, *dyspepsia*, *general debility*, etc.

The warm infusion is an excellent emetic and diaphoretic, appropriate in cases similar to those in which warm draughts of chamomile also prove useful.

Dose.—One to five grams (15 to 75 grains), best given in the form of fluid extract.

EUPATORII [PERFOLIATI] EXTRACTUM.

EXTRACT OF BONESET.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.05 to 0.5 gram (1 to 10 grains) two or three times a day.

EUPATORII [PERFOLIATI] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF EUPATORIUM [PERFOLIATUM].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to five cubic centimeters (15 to 75 minims).

EUPATORII INFUSUM.

INFUSION OF EUPATORIUM.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). (See directions under title "Infusa.")

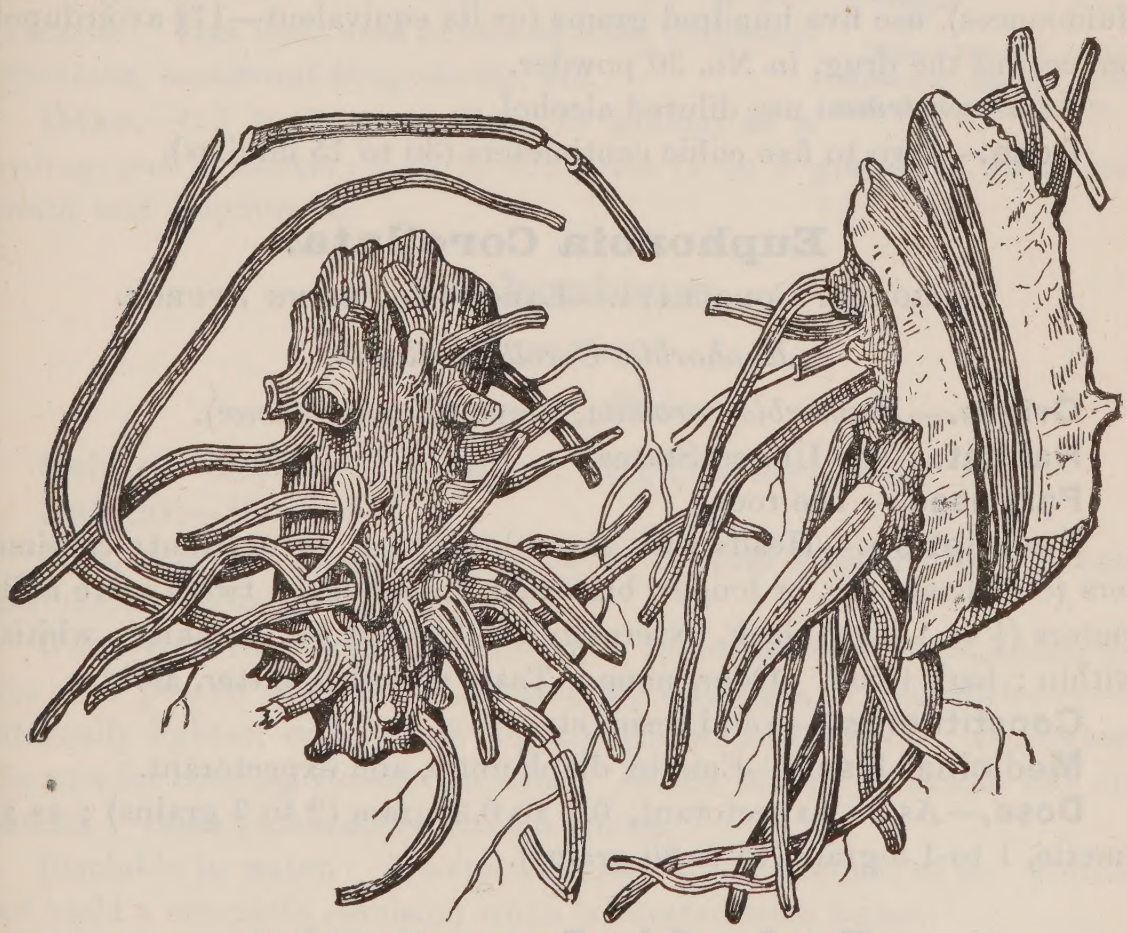
About the same strength as the preparation of 1870.

Dose.—As an emetic, two hundred and fifty cubic centimeters (½ pint) of the warm infusion; as a tonic, twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms) of the cold infusion, several times a day.

Eupatorii Purpurei Radix.

EUPATORIUM PURPUREUM.

Queen of the Meadow, Gravel Root, Joe-Pye Weed, Trumpet Weed.



FIGS. 251.—Eupatorium Purpureum, natural size.

Origin.—*Eupatorium purpureum*, Linné (*Compositæ*).

Habitat.—United States.

Parts used.—The root and rootlets.

Description.—Rough, branched roots, longitudinally sliced, from twenty-five to fifty millimeters (1 to 2 inches) long, and about twenty

millimeters ($\frac{4}{5}$ inch) in diameter ; hard, tough, hollow in center ; externally brownish-black, finely wrinkled lengthwise ; bark thin ; rootlets numerous, slender, brittle ; wood yellowish, with large medullary rays ; odor faint but disagreeable ; taste of bark and rootlets resinous, slightly bitter, afterward acrid ; wood tasteless.

Constituents.—Acrid resin and volatile oil.

Medicinal Uses.—Stimulant diuretic, used in diseases of the urinary organs, especially if an excess of uric acid is present.

Dose.—Two to five grams (30 to 75 grains), best given as fluid extract.

EUPATORII PURPUREI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF EUPATORIUM PURPUREUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Euphorbia Corollata.

EUPHORBIA COROLLATA.—LARGE-FLOWERING SPURGE.

Euphorbiæ Corollatæ Radix.

Origin.—*Euphorbia corollata*, Linné (*Euphorbiaceæ*).

Habitat.—The United States.

Part used.—The root.

Description.—Heads with short branches ; roots twenty centimeters (8 inches) long, or longer, branched, from five to twenty-five millimeters ($\frac{1}{5}$ to 1 inch) thick, externally blackish-brown, wrinkled, whitish within ; bark thick. Odor, none. Taste sweetish, bitter, acrid.

Constituents.—Acrid resin, etc.

Medicinal Uses.—Emetic, diaphoretic, and expectorant.

Dose.—As an expectorant, 0.1 to 0.2 gram (2 to 3 grains) ; as an emetic, 1 to 1.5 gram (15 to 20 grains).

Euphorbia Ipecacuanha.

EUPHORBIA IPECACUANHA.—IPECACUANHA SPURGE.

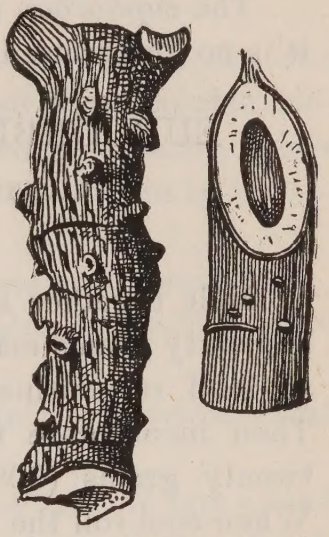
Euphorbiæ Ipecacuanhæ Radix.

Origin.—*Euphorbia Ipecacuanha*, Linné (*Euphorbiaceæ*).

Habitat.—The United States near the Atlantic coast.

Part used.—Root.

Description.—About five centimeters (2 inches) or less, long heads, knotty, branched, marked by scars from the stems. Roots over thirty centimeters (12 inches) long, and about one centimeter ($\frac{2}{5}$ inch) thick, more or less branched; externally light yellowish-brown, wrinkled; whitish within; bark thick. Odor, none. Taste sweetish, bitter, acrid.



FIGS. 252–253. — Ipecacuanha Spurge, root and stem, natural size.

This drug resembles the root and stem of Apocynum cannabinum and Apocynum androsæmifolium.

Constituents.—Acrid resin, euphorbon, and possibly some glucoside.

Medicinal Uses.—It is emetic, diaphoretic, and expectorant, and in large doses hydragogue cathartic. Has been used in *bilious colic*, *dropsical affections*, *menstrual irregularity*, etc.

Dose.—0.5 to 1 gram (8 to 15 grains) as a hydragogue cathartic; 0.05 to 0.2 gram (1 to 3 grains) as an expectorant and diaphoretic.

Euphorbium.

EUPHORBIUM.

Euphorbiæ Resina.

Origin.—*Euphorbia resinifera*, Berg (*Euphorbiaceæ*).

Habitat.—Morocco.

Character.—A gum-resin which flows from incisions in the stem and hardens in the air.

Description.—Irregular, conical, or round tears or drops, about the size of a pea to the size of a hazelnut, yellowish, or yellowish-brown, internally lighter, opaque, or slightly translucent, brittle. Inodorous, the powder causing violent sneezing. When heated it smells like olibanum. Taste persistently acrid, burning.

Insoluble in water. Alcohol dissolves about one-half of it. It does not yield a complete emulsion when triturated with water.

Constituents.—About thirty-eight per cent. of an amorphous *acrid resin*, soluble in alcohol at ordinary temperatures; twenty-two per cent. *euphorbon*, a colorless and indorous acrid substance, readily soluble in boiling alcohol and ether, and obtained in a crystalline mass by a rapid evaporation of the hot alcoholic solution. It also contains eighteen per cent. gum, twelve per cent. malates, etc.

Properties.—The acrid resin renders the euphorbium rubefacient and vesicant. It is used chiefly as an ingredient in vesicatory plasters, such as the popular Janin's plaster.

The *euphorbon* makes the drug a drastic purgative and emetic ; but it is no longer used internally.

EUPHORBII EMPLASTRUM CANTHARIDATUM.

CANTHARIDES PLASTER WITH EUPHORBIUM.

Janin's Plaster.

Melt together sixty grams (2 ounces 50 grains) Venice turpentine, and sixty grams mastiche, sifting the finely powdered mastiche into the warmed turpentine, and mixing the two uniformly before melting. Then incorporate ten grams (154 grains) powdered euphorbium, and twenty grams (308 grains) powdered cantharides, previously mixed. When cool roll the plaster, with moistened hands, on a clean wet board or slab into sticks about one centimeter ($\frac{2}{5}$ inch) in diameter. Keep it in a drawer with a sufficient quantity of lycopodium to keep it from sticking together.

This plaster is used for preparing small blistering plasters, to be applied behind the ears, etc. It sticks well, and never fails to draw blisters.

Extracta.

EXTRACTS.

Solid Extracts, E.; *Extrakte*, G.; *Extraits*, F.; *Extrakter*, Sw.

From semisolid to dry preparations made by extracting the soluble and medicinal constituents of crude drugs by means of suitable solvents, and then evaporating the liquid extract until the product has the proper consistence.

In the preparation of solid extracts the following conditions require attention :

The drug must be in a proper condition to be thoroughly exhausted. When percolation is resorted to for this purpose the drug is reduced to powder, the fineness of which must depend in each case upon the character of the drug, as is the case in preparing fluid extracts. As a larger quantity of menstruum can be used in making solid extracts than it is practicable to employ in making fluid extracts on a small scale, the drug may, in many cases, be less finely powdered or comminuted when exhausted for the purpose of obtaining the first-mentioned preparations. Yet the great disadvantage of prolonging the exposure of the drug to heat in evaporating the liquid is so great as to render it far preferable

to use as little menstruum as may be consistent with complete exhaustion, and hence the drug should in every case be brought to as fine a state of division as is practically most favorable to its perfect and ready penetration and extraction by the solvent.

The menstruum must be properly selected. It should be the one that will best extract in an unaltered condition all those soluble constituents of the drug which contribute to its medicinal value, while leaving the inert, and especially the objectionable, substances in the remaining *marc.*

Aqueous extracts are those made with water alone as a menstruum.

Alcoholic extracts are those made with alcohol alone, or with alcohol and water mixed in various proportions.

Ethereal extracts are made with ether, and are in the Pharmacopœia of the United States called *oleo-resins.*

Inspissated juices are extracts made without the use of any added solvent, the expressed juice of the bruised fresh or green (not dried) drug being used.

The extraction must be complete. It is effected either by maceration, percolation, digestion, or decoction, according to the nature of the drug. As a rule heat is objectionable, and in numerous cases destructive ; in other cases again it is beneficial, or even absolutely necessary, as in the preparation of extract of malt. In former times boiling was resorted to in some cases when aqueous extracts were made. This is no longer done, as it is in every case injurious. Percolation and cold or moderately warm infusion are the modes of extraction now used.

The evaporation must be conducted at the most appropriate degree of *heat.* This is the most delicate part of the process, for in its conduct it is necessary to take into consideration three important factors which materially affect the character of the product, viz., the degree of heat employed, which should be moderate enough not to alter the character of the constituents of the drug ; the length of time during which the heat is applied, which should be as brief as possible, consistently with a moderate degree of temperature ; and the exposure to air, which must be also avoided as far as practicable. The evaporation is aided by stirring, which also contributes to the homogeneous character of the product, and in some cases is necessary on the latter account alone, as for instance in ext. physostigmatis.

The official and other extracts, for which detailed formulæ are given in this book, furnish examples which illustrate the general rule.

The temperature at which drugs are infused for making extracts may, in most cases, be between 15° and 25° C. (59° to 77° F.), and is aided by agitation. Where alcohol is used most of it may be recovered

by distillation over a steam- or water-bath, the alcohol so recovered being used again for the preparation of the same extract after having been properly re-distilled and strengthened or diluted for that purpose as may be required.

In the evaporation of the extract a higher heat than 50° C. (122° F.) is frequently injurious, while in other cases 70° C. (158° F.) may be permitted. In a few instances the full heat afforded by the water-bath, or 90° to 95° C. (194° to 203° F.) may be applied without risk, as in most aqueous extracts. When extracts are evaporated to dryness the heat toward the latter part of the process must not exceed 50° C. (122° F.).

The finished extracts must be put into their proper receptacles while yet warm. These receptacles should be perfectly dry, and after being filled ought to be left to cool somewhat before being covered. They are to be covered tightly.

Good, carefully made, solid extracts have the characteristic odor and taste of the drugs from which they are respectively prepared. The odor is brought out more prominently by warming a small sample with a little solution of potassa. They should be sufficiently solid not to run when the containing vessel is inverted. It is best to keep them in a cool place.

In order to prevent their becoming too hard by drying, the Pharmacopœia prescribes, wherever practicable, the addition of one-twentieth or five per cent. of glycerin.

Dried and powdered extracts are very convenient for dispensing, and, moreover, more uniform in strength than those of a pilular consistence. Hence, whenever it can be done without injury to the quality of the preparation, the extract ought to be finished in that way. This is conveniently effected by forming the pilular extract into thin cakes, which are then placed in a tray with a sufficient quantity of lycopodium to prevent adhesion, after which the tray is put in the drying closet, the temperature of which is controlled carefully. The powdering may then be successfully performed.

To make solid extracts properly is a very difficult art, which requires thorough training and experience, for it is impossible to apply any one rule in any large number of cases. A knowledge of drugs, thoughtful judgment, and constant watchfulness are imperatively necessary in order to succeed.

In the working formulæ for the official extracts as full directions are given as practicable in a Pharmacopœia.

Vacuum apparatus is of great service in the manufacture of solid extracts. It is, however, beyond the reach of the retail pharmacist with very few exceptions.

Extracta Fluida.

Fluid Extracts.

Well-made fluid extracts are, as a rule, the most efficient as well as convenient of all preparations of vegetable drugs. They are extracts in liquid form, containing all that is of any medicinal value in the respective drugs from which they are prepared, and in an unaltered condition, representing, in fact, all but the inert portions. They are concentrated, so as to present the drug in the smallest possible bulk, and yet liquid, so as to be readily absorbed. Their doses bear the simplest possible relation to the doses of the drugs themselves. The fluid extracts should, in fact, and do already in a great measure, render infusions, decoctions, and tinctures obsolete, with rare exceptions. Infusions are properly made from mucilaginous drugs, but not from any drug containing any therapeutically active substances. There is not one of the official infusions which may not be dropped as useless or inferior to the corresponding fluid extract. Decoctions are equally crude, unreliable, and worthless. Water—the menstruum used in the preparation of decoctions and infusions—is not the best menstruum for the extraction of those constituents which characterize our most potent drugs, and, besides, the processes by which the preparations named are made, are apt to produce neither satisfactory nor uniform results.

The Constituents of Drugs.—These may be grouped into two classes : those which are insoluble in all ordinary solvents, and those which can be extracted by suitable treatment.

The *insoluble* group of substances is made up of cellulose, lignin, and sclerogen, which make up the cell-walls of vegetable matter. The intractability of these substances, and of the structures from which they are made, is remarkable. All of the extractable matters are contained within the cells, or in the intercellular spaces—that is, the insoluble and intractable skeleton of the vegetable substance firmly encloses all of the soluble matters, except in the case of mucilage, which is often contained in the cell-wall from which it is produced, and of which it forms a part.

The insoluble constituents of the mass of the drug being inert by reason of their insolubility, they are of interest to the pharmacist only as mechanical obstructions. To reach the cell contents, and the intercellular contents, the cell-walls must be broken into, torn, or separated, because the extraction of these contents, however soluble, by osmosis is never complete, and generally quite impracticable.

The *soluble* constituents are first to be grouped into *inert matters*, and *active principles*. The inert matters are principally starch, gum,

and pectin, etc., which may be separated or extracted by water, cold or hot, and, to a considerable extent, from even a coarsely comminuted drug.

Starch is not really *dissolved* out, being practically insoluble in all the ordinary solvents, and thus cannot be carried through the cell-wall by osmotic currents; but starch cells are usually large and soft, and hence are readily torn by a comparatively coarse mechanical division, allowing the escape of the granules and their separation by merely washing them out, or their extraction in a state of quasi-solution by means of hot water, in which they swell so as to burst the cell-walls.

The *vegetable mucilage* is generally metamorphosed cell-wall, and may form either the inner or outer layers of the cell-wall itself. If it forms the outer layers, then water causes the mucilage to swell and dissolves it, the cell appearing as if imbedded in a gelatinous mass. If it forms the inner layers of the cell-wall the outer portion is insoluble, but the mucilage absorbs water with great avidity by osmosis, swelling with much force and rupturing the resisting and insoluble cell-walls and is then dissolved in the water until it forms thin mucilage.

Water softens the cell-walls and restores their elasticity and penetrability, so that when brought in contact with watery fluids the cells reassume their original size and form.

Sugar, *pectin*, and *vegetable albumen* are contained in watery solution in the juices of plants, and are comparatively easily extracted.

The *active constituents* of drugs are alkaloids, acids, salts, indifferent or neutral principles, such as glucosides, etc., volatile oils, resins, and a number of substances the character and composition of which are not yet fully known. Comparatively few of these substances can be perfectly extracted from the drugs by the use of water alone. Opium will yield all of its morphine to water, and nearly all the soluble matter in rhubarb may be exhausted by percolation with that solvent, because in opium the cellular structure is absent, and in rhubarb the cells are soft and large, and in both of these drugs the active constituents are, in the condition in which they naturally exist, comparatively readily taken up. But these are exceptional cases. As a rule the active constituents of our drugs are not readily soluble in simple watery menstrua. In certain cases the addition of acids or alkalies to the water will effect the chemical solution of these substances, and the use of chemical menstrua unquestionably deserves, and will in future receive, more attention than it has heretofore had; but in cases where it is desired to extract the active matters without altering their chemical character or associations, experience has taught that alcohol is one of the most generally applicable of all simple solvents. At the same time al-

cohol, ether, etc., harden the cell-membranes instead of softening them, and prevent osmosis.

From these considerations it is obvious that in order to thoroughly extract the active principles it is generally necessary to bring the solvent into actual contact with them, which can only be accomplished by breaking, tearing, or separating the cells which make up the structure of the drug.

The Fineness of the Drug.—The degree of disintegration requisite to insure the thorough extraction of all the active constituents of a drug depends principally upon the size of the cells, ducts, tubes, intercellular spaces, or other vessels in which these matters are enclosed. The aid to extraction afforded by capillary attraction is also to be considered. On the other hand, the difficulties sometimes arising when the drug is treated in the state of very fine powder, such as the agglutination of the particles into a comparatively impenetrable mass by the action of the solvent, must not be lost sight of, although it is desirable to overcome these without sacrificing the minuteness of the mechanical division of the drug. The choice of menstruum has much to do with this.

When the intercellular spaces constitute tubes or ducts so large as to be broken into by even coarse comminution, as for instance the oil tubes in umbelliferous fruits, a fine state of powder would seem to be unnecessary, although it certainly facilitates the extraction. But in numerous cases the cells, or vessels, or ducts containing the active principles are of less diameter than the meshes in most of our sieves.

We have already stated that extraction by osmosis alone (through the cell-membranes) is generally impracticable. The extraction of intercellular contents is equally impracticable unless the intercellular spaces are laid open. The isolation of cells is often extremely difficult even by long-continued treatment at a high heat with such powerful chemicals as chlorine *in statu nascenti*, by boiling the vegetable tissue in strong nitric acid, gradually adding potassium chlorate. Their separation by any treatment with our pharmaceutical solvents is impossible.

The average size of vegetable cells is about one three-hundredth inch. The hard wood cells are much smaller than the parenchymatous cells, which generally contain the active principles of drugs. The calibre of ducts and cavities is, of course, greater than that of cells, at least in one direction. Many resin cells are as much as one-fortieth inch in diameter. On the whole, it may be safely assumed that the closed chambers in which the active constituents of our potent drugs are locked up are, in most cases, from one one-hundredth to one three-hundredth inch in diameter.

The Pharmacopœia prescribes different degrees of fineness of the different drugs for the preparation of fluid extracts, ranging from a sieve of twelve meshes to the linear inch to one of eighty meshes to the linear inch. The silk, wire, or hair from which the sieve-cloth is made occupies from one-fifth to nearly one-half of its surface, and hence the diameter of the holes of a No. 20 sieve is not one-twentieth inch, but only about one twenty-seventh inch, and the diameter of the holes in a No. 80 sieve is about one one-hundred-and-fiftieth inch. The particles of powder passing through a No. 12 sieve cannot be above one-fifteenth inch in diameter; those passing through a No. 20 sieve, about one twenty-seventh inch; those through a No. 30 sieve, about one-fortieth inch; those through a No. 50 sieve, about one sixty-fourth inch; those through a No. 60 sieve, about one-eightieth inch; and those through a No. 80 sieve, about one one-hundred-and-fiftieth inch in diameter.

As the cell-walls are not to be separated by powdering, the particles of powder consist of fragments of more than one cell, rather than of separated individual cells. A particle of powder, therefore, of only one one-hundred-and-fiftieth inch in diameter can scarcely contain any uninjured cells of greater diameter than one three-hundredth inch, because in a cube of eight such cells, every cell being exposed, there is little probability that any of them would escape injury when forced through an aperture barely equal to the diameter of the whole. Even if a cube of twenty-seven cells should be cut so as to leave but one whole cell in the centre, we would have only one uninjured cell out of twenty-seven. It is safe to say, therefore, that in a drug reduced to No. 80 powder, almost every individual cell is probably broken up, and both cell-contents and intercellular-contents exposed. In a No. 60 powder, however, at least one-third of the cells escape if all the particles of greater fineness than will barely pass through a No. 60 sieve were to be separated from it; but a considerable portion of a No. 60 powder will pass through a No. 80 sieve, so that even in a No. 60 powder the drug is often sufficiently disintegrated to expose nearly all of its active matter to the action of the solvent with which it is to be treated. Drugs reduced to Nos. 20, 30, or 40 powder, however, are, as a rule, too coarse to admit of their thorough exhaustion except by the aid of osmosis, which calls for the use of very large quantities of menstruum containing much water.

It must be borne in mind, however, that osmosis consists in the absorption of a fluid by a continuous animal or vegetable membrane, and a transudation at some other point, usually on the opposite side. It has been shown by investigations, however, that in living vegetable cells osmosis does not take place by a passing *through* the cell-wall into the

cell, and then on through the opposite cell-wall into the next cell, or, in other words, from cell to cell, but rather by a passing *along* the cell-walls, not transuding into the cell-cavities at all, so that fluid may by osmosis pass through a distance of dozens or hundreds of cell-lengths without coming into contact with the cell-contents sufficiently to exert any solvent action on them whatever. It is more than probable that such an action takes place also in the particles of drug in the percolator, so that larger particles with unbroken cells in their interior will not be totally exhausted because the osmotic current does not pass through the cell-contents but only around them.

Condition of the Drug.—The drug from which a fluid extract or any other galenical preparation is to be made, must be thoroughly sound, of good color, have the proper characteristic odor and taste belonging to it, and must be free not only from parts of other plants or substances and from dirt, but from inert portions of the same plant. It must have been gathered at the proper season, and when used it must be thoroughly air-dry. Unless all of these conditions are fulfilled the products must inevitably be inferior if not worthless.

The Official Process.—A majority of the official fluid extracts are made by essentially similar manipulations. In the "Preliminary Notices" of the Pharmacopœia, pages xxxv to xxxviii, will be found a detailed description of the process of percolation, which should be carefully observed.

To make *five hundred cubic centimeters* (equal to 17 U. S. fluid-ounces) of any fluid extract by the official process, use *five hundred grams* (equal to 17 avoirdupois ounces and 280 grains) of the drug, in powder of the prescribed fineness.

The *menstruum* is specified in each case by the working formula. In many cases the *first menstruum* with which the drug is moistened and macerated is of a different kind from the *second menstruum* used subsequently to push the saturated solution downward through the mass and to complete the extraction which has been but partially effected by the *first menstruum.* In the preparation of fluid extract of wild cherry the extraction is preceded by maceration with water for chemical reasons (see *Prunus Virginiana*). Whenever glycerin is employed the whole quantity used is contained in the "first menstruum." In the first menstruum used for the extraction of aconite root, tartaric acid is used. In the process for preparing solid extract of colchicum root, acetic acid is an ingredient of the first menstruum. In certain other solid extracts the second menstruum is less strong in alcohol than the first menstruum. Fluid extract of licorice root is directed to be

made with a first menstruum containing ammonia. Fluid extract of lactucarium requires special treatment.

The menstruum selected should, as far as possible, be one which, while it thoroughly extracts all of the active constituents of the drug, will at the same time leave the inert soluble matters in the rejected *marc*. It is not intended that all of the extractable matter should be taken out of the drug, loading the fluid extract with gum, etc. The viscidity of a fluid extract is frequently due to inert extractive, and in many instances its presence proves that the menstruum used was not of proper alcoholic strength. In fact a menstruum which will produce a very thick fluid extract is frequently too weak to extract such substances as alkaloids, resins, etc., which constitute the active principles. Thus in cases where an alcoholic menstruum is required to extract the active matter, the well-made fluid extract is rarely viscid. As the substances extracted by one menstruum may differ widely from those dissolved out by a different kind of menstruum, a knowledge of the relative solubility of all the constituents of the drug—inert as well as active—is necessary to an intelligent selection of the proper solvent. The drug may be exhausted by one menstruum so as to yield no more matter to it, and still afterward yield a considerable quantity of matter of a different kind to a new and different menstruum. Formerly some fluid extracts were made by extraction first with one menstruum and then with another, the two percolates being afterward mixed. But this practice is rarely, if ever, attended with favorable results, as the two solutions cannot well be combined without precipitation or some other disadvantageous result.

Moisten the powder in a shallow earthenware, porcelain, granite, iron, or other suitable vessel. The powder must not be *wetted;* it must retain its mobility after being moistened. It is also quite necessary to sift the moistened powder and to allow it to remain loose for a certain period before being packed to prevent the cracking of the packed mass in the percolator.

As it is necessary not only that the drug be subjected "to the solvent action of successive portions of menstruum," but also that the same menstruum may pass through successive portions of the drug, which is the great advantage gained in repercolation, we believe that for operations on a small scale the length of the percolators may advantageously be fully six times their diameter.

After the percolator is charged it should be well covered to prevent loss of alcohol by evaporation. Sheet rubber, one-fourth inch thick, makes the best cover. The percolator should always be placed firmly in a proper stand.

The receiving-bottle ought to be of light-colored glass, so that it can be looked through and the progress of the percolation watched. It must also be large enough to hold rather more than the *first percolate* ("stronger percolate," or "reserved portion"). Unless the receiver is provided with a graduated scale it must be graduated extemporaneously. This may be done by measuring into it exactly as many cubic centimeters (or fluidounces) of water as there is to be of the first percolate, and then pasting a strip of paper securely around the bottle so that the *upper edge* of the strip coincides exactly with the surface of the water. The bottle is then emptied, rinsed with a little of the proper menstruum, and placed under the percolator.

When maceration is to precede percolation, pour into the packed percolator enough menstruum to saturate the drug all through, and to cover the top of it with a layer of liquid about twelve millimeters ($\frac{1}{2}$ inch) deep. Let the menstruum settle down until it begins dropping out of the exit tube of the percolator, adding more menstruum if necessary to insure that the surface of the packed drug is still covered with liquid. Then close the exit tube and cover the top of the percolator well.

After the maceration prescribed open the exit tube and let percolation go on. When the saturated liquid which had collected at the bottom of the percolator during the maceration has run out, and when the percolation becomes slow, pour more menstruum into the percolator, enough to cover the top of the drug each time. A new addition of menstruum should not be made at any time until after the quantity previously added has sunk down below the surface, and then only sufficient to cover the top well.

The Pharmacopœia prescribes in each case that a certain specified quantity of the percolate which first runs out, and which is the strongest portion of the whole percolate, shall be removed from under the percolator and set aside before the percolation is continued further. It says: "Reserve the first —— of the percolate," stating each time the exact quantity to be reserved. Later in the formula it directs that the soft extract obtained by evaporating the subsequent percolate shall be dissolved in the "reserved portion." For convenience we will invariably refer to this "reserved portion" as the *first percolate.*

When the first percolate has been obtained—that is, when the surface of the percolate in the receiver is on a level with the upper edge of the strip of paper pasted around it as suggested, close the exit tube of the percolator for the time being and change the receiver. Put the first percolate aside, properly labelled in full.

After placing a new receiver under the percolator, again open the exit tube and continue the percolation, adding menstruum from time to

time, as may be necessary, until the drug is exhausted. Generally it is not difficult to determine when the drug is exhausted, for in most cases it is practicable to extract very nearly all of the coloring matter, and simultaneously with it nearly all of the soluble constituents having any perceptible odor or taste. When the percolate no longer has any color, odor, or taste derived from the drug, the drug is exhausted, so far as the menstruum used will exhaust it. But perfect exhaustion of the drug is not always reached, although it is quite practicable to carry the percolation so far in every instance that the menstruum used no longer dissolves out any more. It must be borne in mind that a coarsely ground drug can be percolated, yielding a considerable quantity of soluble matter to the menstruum, and may be apparently exhausted, the percolation being continued until no longer any perceptible color, odor, or taste is imparted to the percolate, and yet after drying the marc and powdering it to a higher degree of fineness, the same drug may still yield more soluble matter to the same kind of solvent as before used. As a rule, the ground drugs prepared and sold by drug millers for the trade are much too coarse to be successfully exhausted.

In many cases it requires a very large quantity of menstruum to bring the extraction of soluble matter near enough to exhaustion to get a colorless, odorless, and tasteless percolate. All drugs, however, if fine enough, may be practically perfectly exhausted of their active matters by carefully conducted repercolation.

The *second percolate* is generally all of the percolate collected after the reserved "first percolate." (In some cases there is also a *third percolate*, as in fluid extract of wild cherry.) There is a wide difference between the two portions of percolate. The constituents and the medicinal properties, as well as the relative quantity of extracted matter contained in the first percolate frequently vary in a marked degree from those of the second percolate. The most active and valuable, as well as the most volatile and delicate principles of the drug are generally contained in the *first percolate*. Hence this is to be reserved, and the second percolate is the only portion exposed to any heat for the purpose of concentrating it so that the whole may be brought within the prescribed volume.

In certain cases where unstable constituents are contained in the second percolate, which are liable to be expelled or altered by the heat and exposure to air during the evaporation, the injury is attempted to be avoided by chemical means, as when hydrochloric acid is added to the second percolates previously to their evaporation in the preparation of the fluid extracts of conium and ergot. The addition of these agents is not necessary when repercolation is the process used.

The official process is the only one practicable when fluid extracts are prepared on a limited scale. No process has yet been devised for the preparation of fluid extracts in small quantities which is not objectionable in some way, and the least objectionable method is the one adopted in the Pharmacopœia. The only method known which is perfect, or as nearly so as any galenical process can be, is to exhaust successively different portions of the drug with the same menstruum, and to systematically collect the several percolates fractionally, by which method exhaustion can be effected with a less quantity of menstruum, and evaporation be entirely avoided. "Repercolation," "fractional percolation," etc., are processes such as described. The Pharmacopœia expressly authorizes the employment of this method "where it may be applicable" (page xxxviii); but it is unfortunately applicable only in the manufacture of these preparations on a large scale, or where the same fluid extract is repeatedly made, and it cannot be used at all when small quantities are made, or in the preparation of an extract made only once.

For the purpose of evaporating the second percolate, weigh a suitable porcelain or enamelled evaporating dish, and put a label on it giving its weight. (This is called the "tare".) Then, having poured the second percolate into the dish, place it on a water-bath, and evaporate the liquid at a temperature not exceeding 50° C. (122° F.) until it has acquired the consistence of a soft, solid extract, stirring diligently, especially toward the latter part of the evaporation when the extract begins to thicken.

When smaller quantities are operated upon, the alcohol contained in the second percolate as well as that retained by the marc (exhausted drug) left in the percolator will be an unavoidable loss, as the apparatus and arrangements necessary for distillation would require too great an expenditure of time and labor. The alcohol recovered would, moreover, be unfit for any use other than the preparation of the next lot of the same extract.

The soft extract obtained by the evaporation of the second percolate is dissolved in the first percolate (or "reserved portion"), and finally a sufficient quantity of the menstruum is added to make the total bulk of the liquid five hundred cubic centimeters (17 fluidounces) for every five hundred grams of drug used, and the whole is then shaken well together. The mixture now obtained is the finished fluid extract.

In the preparation of fluid extract of senega two per cent. water of ammonia is added to the finished preparation in order to prevent subsequent precipitation of a gelatinous character which otherwise might occur. In certain other fluid extracts prepared with aqueous menstrua,

or from which the first alcohol has been distilled off for the purpose of separating resin, as in ipecac, the preservation of the finished product is insured by adding a sufficient quantity of alcohol (as in castanea and triticum).

Official Standard of Strength.—The fluid extracts of the new Pharmacopœia are so prepared that each cubic centimeter of the finished preparation represents the active constituents of one gram of the drug. Thus five hundred cubic centimeters (or 17 fluidounces) of fluid extract is made from five hundred grams (17 ounces and 280 grains avoirdupois). Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains. The new fluid extracts are, therefore, almost exactly five per cent. weaker than those of the Pharmacopœia of 1870, in accordance with which twenty fluidounces of fluid extract represented twenty troyounces of the drug, while the new pharmacopœial standard of strength makes twenty-one fluidounces of fluid extract from the twenty troyounces of drug.

The menstrua and manipulations, however, prescribed by the new Pharmacopœia are such that the new fluid extracts are undoubtedly greatly superior to those made by the old processes.

Unofficial Fluid Extracts.—The Companion gives working formulæ for such unofficial fluid extracts as are used to any considerable extent. The general principles to be observed in preparing fluid extracts, in the absence of any formula, are as follows : If an analysis of the drug has been made, the menstruum should be selected accordingly. If no analysis exists, and it is impracticable to make one, then the general character of the constituents of the drug may possibly be discovered by odor and taste, by other physical properties, and by the known constituents of related drugs. The fineness of the powder must depend upon the character of the active constituents and the menstruum, and should generally be finer with an alcoholic solvent than with an aqueous one. The formula constructed can then be confirmed or improved by the results of actual trials.

Consistence, Color, etc.—Fluid extracts are generally dark colored, and often comparatively thick. The color varies from a pale amber, as in physostigma, to an almost black brown, as in sarsaparilla, and almost all the darker shades of brown, green, red, and yellow are represented in a full assortment of this class of preparations. Their density varies nearly as much as their color, several of them, which are necessarily made with strongly alcoholic menstrua and contain but little extractive matter taken up by such solvents, being lighter than water, while others are almost as dense as syrup. Made with menstrua

containing much water, they are much denser than the same fluid extracts when made with a greater proportion of alcohol. Great viscidity, instead of being a safe indication of strength, frequently proves that the menstruum was one more capable of extracting a large *quantity* of matter than extracting the right *kind* of matter.

In the Pharmacopœia of 1870, about two-thirds of the fluid extracts were directed to be made with glycerin (thirty-three out of forty-six). This was a useless waste of glycerin. In the new Pharmacopœia glycerin is used in only seventeen fluid extracts out of seventy-nine—less than one-fourth. The new fluid extracts, prepared without glycerin, are certainly much to be preferred in every way ; but the corresponding fluid extracts of 1870 doubtless are a great deal thicker and heavier, and pharmacists, as well as physicians who have not observed the changes made in the menstrua, will in many cases notice the difference in density.

Many manufacturers who do not make use of glycerin, except where prescribed by the Pharmacopœia, and in such unofficial fluid extracts as really require it, will unquestionably receive complaints that their products are less dense than those of others. It is well to bear in mind that the glycerin and sugar used in many fluid extracts in the past are still being used for the sole purpose of obtaining thick-looking fluid extracts which might be supposed to be stronger than they are.

In cases where glycerin is used for this purpose only, it can be detected by attempting to evaporate a small quantity of the fluid extract to dryness ; if no glycerin is present, a dry residue is readily obtained, whereas the presence of glycerin will render evaporation to dryness impossible.

Sugar is detected by the caramel odor developed when a sample of the fluid extract is evaporated to dryness and exposed to strong heat.

The good quality of fluid extracts must be judged of by odor, taste, and actual therapeutic trial, rather than by color and density.

Preservation.—To prepare fluid extracts, such as fully represent all the medicinal activity of the respective drugs, cubic centimeter for gram, and which keep well, retaining their activity and their freedom from deposit, is by no means easy. It can generally be done, however, by the exercise of good judgment and skilful manipulation. But the very best fluid extracts require to be carefully preserved in order to retain their good quality. They must be kept in a moderately warm room, where no great or sudden changes of temperature take place, and as many of them are unquestionably more or less injured by exposure to light, they should be kept in a rather dark place, or preferably in amber-colored bottles, which effectually exclude the actinic rays of light.

Farina.

FARINA.

This general title is applied to meal or flour, as to flax-seed meal, barley-meal, oatmeal, wheat flour, etc.

In a limited sense it applies to certain cereal foods prepared from wheat or other grain, and usually coarse and free from fine powder.

The several kinds of flour are in this work referred to under the respective titles of the cereals, etc., from which they are made.

Fel Bovis; U. S.

OX-GALL.

Fel tauri, Bilis bovina—Ochsengalle, Rindsgalle, G.; *Fiel (Bile) de bœuf,* F.; *Oxgalla,* Sw.

Origin.—*Bos Taurus,* Linné (*Mammalia*).

Description.—Fresh ox-gall is brownish-green, viscid, has a peculiar nauseating odor, and an extremely bitter, offensive taste. When shaken it froths ; it saponifies fats ; and usually has an alkaline reaction. Its specific gravity is 1.018 to 1.028.

Constituents.—It contains the sodium salts of glycocholic and taurocholic acids, cholesterin, and coloring matters.

Test.—With sugar and concentrated sulphuric acid it gives a handsome purple violet color.

When obtained for preparing the inspissated or the purified ox-gall, it must be used the same day the beef was killed, and must not be permitted to remain exposed to summer heat.

Medicinal Uses.—Ox-gall is used as a purgative in *constipations* due to *atony of the bowels.* It is given in the form of inspissated ox-gall, in doses of 0.3 to 0.5 gram (5 to 8 grains) in pill.

FEL BOVIS INSPISSATUM; U. S.

INSPISSATED OX-GALL.

This is prepared by heating five hundred grams (17⅔ avoirdupois ounces) of fresh ox-gall to a temperature not above 80° C. (176° F.), straining through muslin, and then evaporating the strained liquid in a porcelain dish over a water-bath, until reduced to seventy-five grams (2 ounces and 280 grains avoirdupois).

Heating it, and using a well-wetted straining cloth, render the clarifi-

cation of the crude gall easy and effective. A metal vessel must not be used in the process.

Dose.—0.3 to 0.5 gram (5 to 8 grains) in pill.

FEL BOVIS PURIFICATUM; U. S.

PURIFIED OX-GALL.

Evaporate three hundred grams (10 ounces 255 grains) of fresh ox-gall in a porcelain evaporating dish on a water-bath until it weighs one hundred grams (3 ounces 230 grains); then add one hundred grams ($4\frac{1}{6}$ fluidounces) of alcohol; shake well, and set the mixture aside, well covered, for several days. This separates mucous matter. Decant the clear solution, filter the remainder, and after mixing the two clear liquids, distil off the alcohol in the usual way, after which evaporate the residue to the consistence of solid extract.

Twenty-four hours' maceration with the alcohol, as prescribed by the Pharmacopœia, is insufficient, as the separation of the mucilaginous matter will require two or three days.

The preparation is yellowish-green, and has a sweetish bitter taste.

Test.—Forms a green clear solution with water; this solution is not precipitated by alcohol.

Dose.—0.3 to 0.5 gram (5 to 8 grains) in pill.

Fermentum.

YEAST.

Oberhefe, G.; *Levûre de bière*, F.; *Jäst*, Sw.

Origin.—*Torula cerevisiæ*, Turpin (*Fungi*).

Obtained from beer and other fermenting malt liquors.

Description.—A whitish or pale yellowish-brown viscid liquid, or frothy semifluid, containing innumerable cells which under the microscope have the appearance seen in the figure. Yeast has a peculiar unpleasant odor, and a bitter taste.

FIG. 254.—Yeast cells, magnified.

Medicinal Uses.—Antiseptic and stimulant. Has been used internally in *typhoid conditions*. Also in *diabetis*, in which disease it is said to have caused the total disappearance of sugar from the urine.

Externally it is used as a stimulant and antiseptic dressing to *indolent* and *ill-conditioned wounds* and *ulcers*.

Dose.—Fifteen to thirty cubic centimeters (4 to 8 fluidrachms) before meals.

FERMENTI CATAPLASMA, B.

YEAST POULTICE.

Beer yeast, ninety grams (3 ounces) ; wheat flour, two hundred and ten grams (7 ounces) ; warm water, ninety cubic centimeters (3 fluidounces). Mix the yeast and water, and then stir in the flour. Put the mass in a warm place until it rises.

Ferrum ; U. S.

IRON.

Eisen, G.; *Fer*, F.; *Hierro*, Sp.; *Jern*, Sw.

The most important of all the true metals, and the most abundant and generally distributed. Occurs both free and combined. Its physical properties are familiar.

Ferrous salts (the so-called "proto-salts" of iron) are white when anhydrous, and bluish-green when combined with water of crystallization. When exposed to the air they gradually oxidize. Nitric acid, chlorine, and hypochlorous acid convert ferrous into ferric salts.

Ferric salts (the so-called "per-salts" or "sesqui-salts" of iron) are brown-red or white.

Among the official and other important iron salts the following are soluble :

FERROUS chloride, iodide and bromide, sulphate, lactate ; and FERRIC chloride, iodide, bromide, sulphates, nitrate, and the citrates, phosphates, tartrates combined with alkaline citrates or tartrates.

The form of iron best fitted for pharmaceutical preparations is fine, bright, non-elastic wire. Card-teeth, iron wire, tacks, filings, reduced iron—all these have been used for making the several iron preparations prepared from metallic iron ; but to insure freedom from other metals wire should be selected, and annealed wire is the purest that can found.

The iron preparations used in medicine are very numerous.

FERRI LIMATURA.

IRON FILINGS.

Clean wrought-iron filings, free from brass, copper, tin, or other metals, and free from rust and grease.

Uses.—For making iron preparations iron wire is better, and is the kind prescribed by the Pharmacopœia.

Ferri Acetas.

ACETATE OF IRON.

Obtained by carefully evaporating solution of acetate of iron to dryness. It is a dark red-brown mass of scaly particles.

Medicinal Uses.—Same as those of the solution. The preparation is rarely used.

LIQUOR FERRI ACETATIS; U. S.

SOLUTION OF ACETATE OF IRON.

Ferrici Acetatis Solutio—Solution of Ferric Acetate.

Put eight hundred grams (28 ounces 96 grains) water of ammonia and two liters (68 fluidounces) of water in a three-gallon jar. Dilute one thousand grams (35 ounces 120 grains) solution of tersulphate of iron with three thousand five hundred grams (about 7½ pints) water. Add the iron solution to the ammonia during constant stirring. Transfer the whole from the jar to a wet muslin strainer. Let it drain. Then put the precipitate back into the jar and mix it well with six liters (about 13⅔ pints) of water. Pour it on the strainer again to drain. Repeat this washing operation until the water which drains off only gives a slight cloudiness with test-solution of barium chloride—that is, until nearly all the ammonium sulphate has been washed away. Now let it drain thoroughly; press the precipitate while folded up in the straining cloth so as to press out enough of the water to reduce the total weight of the mass to seven hundred grams (24 ounces 300 grains) or less. To the cake, previously well broken up, add two hundred and sixty grams (9 ounces 75 grains) glacial acetic acid, and stir the whole together. Let stand, stirring it occasionally, until the ferric hydrate is entirely dissolved. Then add enough cold distilled water to make the final product weigh one thousand grams (35 ounces 120 grains).

This preparation should be made in cool weather, and cold water must be used throughout the process. Otherwise ferric bishydrate may be formed in sufficient quantity to render the solution of the precipitate in the acetic acid difficult, if not to partially defeat it, whereby a turbid or imperfect solution would be obtained. It is so important to avoid all heat that it is even advisable to add the ferric hydrate only in small portions at a time to the glacial acetic acid, because the use of such strong acid will otherwise cause an elevation of temperature from the

chemical reaction. Filtration does not, in our experience, render a turbid preparation clearer, and it is, moreover, an exceedingly slow operation.

Properties.—See the Pharmacopœia, page 196. The solution of acetate of iron has a specific gravity of 1.16, corresponding to 20° Baumé, and is a dark, red-brown, transparent liquid, having the odor of a dilute acetic acid, and a somewhat acid, styptic taste. When heated it becomes turbid, and a deposit of ferric hydrate is formed through loss of acetic acid.

Preservation.—It must be kept in bottles with well-fitting glass stoppers, and in a dark place.

Strength.—Ten grams (154$\frac{3}{10}$ grains) of the solution, with a few drops of nitric acid added to prevent reduction, evaporated to dryness, and carefully ignited, should leave a residue of ferric oxide weighing one hundred and thirteen centigrams (17$\frac{1}{2}$ grains).

This would prove the presence of thirty-three per cent. anhydrous ferric acetate, corresponding to eleven and one-half per cent. ferric oxide, or to about eight per cent. metallic iron. It was not official in previous Pharmacopœias of the United States.

A fourteen-ounce acid bottle is required to hold sixteen ounces of this preparation. It is sold by the pound.

Medicinal Uses.—Like other salts of iron with vegetable acids this preparation is more useful as a chalybeate tonic than as an astringent. It is seldom given in this form, but is often used to prepare tinctures of acetate of iron.

Dose.—0.1 to 0.5 cubic centimeter (2 to 10 drops) freely diluted.

FERRI ACETATIS TINCTURA; B.

English Tincture of Acetate of Iron.

Dissolve sixty grams (2 ounces) potassium acetate in three hundred cubic centimeters (10 fluidounces) of diluted alcohol (U. S. P., 1880); mix one hundred and twenty four grams (4$\frac{3}{8}$ ounces) solution of tersulphate of iron (U. S. P., 1880) with two hundred and forty cubic centimeters (8 fluidounces) diluted alcohol; then mix the two liquids and shake well from time to time during an hour. Filter, passing enough diluted alcohol through the filter to make the final product measure six hundred cubic centimeters (20 fluidounces).

Must be kept in a well-stopped bottle, in a dark, cool place.

Dose.—0.2 to 2 cubic centimeters (3 to 30 minims) diluted in water.

FERRI ACETATIS TINCTURA; U. S.

TINCTURE OF ACETATE OF IRON.

Ferrici Acetatis Tinctura—Tincture of Ferric Acetate.

This is prepared by mixing three hundred grams (10 ounces 255 grains, measuring about 12½ fluidounces) alcohol and two hundred grams (7 ounces 24 grains, measuring about 7¾ fluidounces) acetic ether, and adding gradually five hundred grams (17 ounces 279 grains) solution of acetate of iron.

Unless care is taken to add the solution of acetate of iron slowly and in small quantities at a time, heat is generated which would drive off acetic acid and acetic ether, and thus injure the product, more or less precipitation of basic acetate of iron being apt to follow.

Preservation.—Must be kept in a cool place, in glass-stoppered bottles, and protected from the light, to prevent chemical decomposition of the acetate.

Strength.—The preparation contains about sixteen and one-half per cent. anhydrous ferric acetate, or five and three-fourths per cent. ferric oxide, or about four per cent. metallic iron.

Description and Tests.—See the Pharmacopœia, page 343.

Dose.—0.2 to 2 cubic centimeters (3 to 30 minims).

Klaproth's Ethereal Tincture of Acetate of Iron was similar to this preparation. It is official in the German Pharmacopœia under the name of *Tinctura Ferri Acetici Ætherea* (*Aetherische Eisenacetat-tinktur*, G.).

Dose.—0.2 to 2 cubic centimeters (3 to 30 minims).

Ferri Arsenias; B.

ARSENIATE OF IRON.

Ferrico-Ferrosus Arsenas—Ferrico-Ferrous Arseniate.

Dissolve one hundred and twenty grams (or 4 ounces) sodium arseniate and ninety grams (or three ounces) sodium acetate in one liter (34 fluidounces) boiling distilled water.

Dissolve two hundred and seventy grams (or 9 ounces) ferrous sulphate in one thousand five hundred cubic centimeters (51 fluidounces) boiling distilled water.

Mix the two solutions, collect the precipitate on a muslin strainer, and wash it until the washings pass tasteless, after which press out the liquid from the washed precipitate, and dry the latter on porous bricks at not over 40° C. (104° F.).

Description.—A greenish or bluish-green amorphous powder, insoluble in water and in alcohol, but soluble in dilute hydrochloric acid. It should theoretically contain about eighteen per cent. ferrous oxide.

Medicinal Uses.—Supposed to combine the alterative effects of arsenic with the tonic effects of iron. Rarely employed.

Dose.—0.004 gram ($\frac{1}{16}$ grain).

Ferri Benzoas.

Benzoate of Iron.

Ferricus Benzoas—Ferric Benzoate.

Prepared by precipitating a dilute solution of ferric chloride with a solution of ammonium benzoate.

It is a flesh-colored powder, odorless and tasteless, insoluble in water, and contains about fifteen and one-half per cent. iron.

Dose.—0.1 to 0.3 gram (2 to 5 grains).

Ferri Bromidi Syrupus; U. S.

Syrup of Bromide of Iron.

Ferrosi Bromidi Syrupus—Syrup of Ferrous Bromide.

Put two hundred cubic centimeters ($6\frac{3}{4}$ fluidounces) distilled water into a thin glass flask ("chemical flask") of about two liters (or one-half gallon) capacity. Then put into the flask thirty grams (1 ounce) cut iron wire. Next add, carefully and in small portions at a time, seventy-five grams (2 ounces 282 grains) bromine. Shake the whole occasionally.

Put six hundred grams (21 ounces 72 grains) coarsely powdered sugar in a porcelain evaporating dish. When the reaction between the bromine and iron has ceased, and the liquid has acquired a green color, and no longer has an odor of bromine, filter the liquid so that the filtrate runs into the sugar in the porcelain dish. Rinse the flask and the iron wire remaining in it with ninety cubic centimeters (3 fluidounces) distilled water, and pass this also through the same filter into the sugar. Stir the mixture with a porcelain or glass rod or spatula, heat it on a sand-bath to the boiling point, stirring constantly and being careful not to burn the sugar. Strain the syrup through linen into a tared bottle, and add enough distilled water through the strainer to make the whole weigh one thousand grams (35 ounces 120 grains). Shake the whole together, and then transfer it to vials of about two hundred cubic centimeters' capacity, filling each bottle to the neck and corking it securely.

Description.—See the Pharmacopœia, page 322. It contains ten per cent. by weight of ferrous bromide. Must have a pale-green color and be clear.

Preservation.—Should be kept in small, well-filled, and tightly corked bottles, which must be put in a place accessible to daylight, as the preparation does not keep in large bottles where it must repeatedly come in contact with the air, and experience teaches that both syrup of bromide of iron and syrup of iodide of iron keep well in full daylight.

Medicinal Uses.—Sometimes, though rarely, employed as an alterative in *scrofula, strumous glandular swellings*, etc. In large doses poisonous.

Dose.—One to two cubic centimeters (15 to 30 minims).

Ferri Carbonas Saccharatus; U. S.

Saccharated Carbonate of Iron.

Ferrosus Carbonas Saccharatus—Saccharated Ferrous Carbonate.

Dissolve one thousand grams (35¼ avoirdupois ounces) pure sulphate of iron in four liters (about 8½ pints) of boiling distilled water. At the same time dissolve seven hundred grams (24 ounces 300 grains) sodium bicarbonate in ten liters (21 pints) of hot distilled water; filter each solution separately. Pour the solution of iron sulphate gradually into the solution of sodium bicarbonate, previously put into a five-gallon jar, and mix thoroughly. Now fill the jar to the top with boiling distilled water, and set it aside for two hours. Then draw off the clear liquid from the precipitate, after which fill the jar again with boiling distilled water and shake it. Repeat the washings in the same way until the water drawn off from the precipitate gives only a slight milkiness with a solution of barium chloride. Then pour the precipitate all out of the jar into a muslin strainer, drain it, and put it into a porcelain capsule with one thousand six hundred grams (56 avoirdupois ounces and 200 grains) of sugar in fine powder. Mix the whole thoroughly, and then evaporate to dryness on a water-bath, and reduce the product to a fine powder, which must be kept in small bottles (about 60 grams, or 2-ounce bottles) corked with corks dipped in melted paraffine or wax.

When the solutions are mixed there is considerable effervescence; hence the precaution to add the iron sulphate solution only "gradually." The washing of the precipitate should be completed as rapidly as possible, and the liquid should not be allowed to get cold.

Must be greenish-brown—not brown.

This is an excellent iron-preparation now for the first time official in

our Pharmacopœia. It has long been official in Germany and in the Scandinavian countries, and also in England, although the British process for its preparation is somewhat different. It is much to be preferred to Vallet's mass, being dry and easily handled, and most of the iron remains in the form of proto-carbonate of iron (ferrous carbonate) a long time when the preparation is properly preserved in small bottles as directed. So long as it remains greenish-gray the preparation is good; a brownish discoloration indicates that it has become oxidized and contains ferric hydrate.

It has a sweet and only slightly ferruginous taste, no odor, and a neutral reaction.

Dose.—0.3 to 1.3 gram (5 to 20 grains) with or after meals.

Ferri Carbonatis Massa; U. S.

Carbonate of Iron Mass.

Ferrosi Carbonatis Massa; Pill Mass of Ferrous Carbonate—Pilula Ferri Carbonatis, Phar. 1870; *Vallet's Mass.*

Dissolve one hundred grams (3 ounces 230 grains) ferrous sulphate in two hundred cubic centimeters (6¾ fluidounces) boiling distilled water. Add thirty cubic centimeters (1 fluidounce) syrup, and then filter.

Dissolve one hundred and ten grams (3 ounces 385 grains) sodium carbonate also in two hundred cubic centimeters (6¾ fluidounces) boiling distilled water. Filter the solution.

When both solutions are cold, mix them in a bottle of the capacity of about five hundred cubic centimeters (17 fluidounces), and add enough distilled water to fill the bottle completely. Cork the bottle tightly, and set it aside until the precipitated ferrous carbonate has settled. Pour off the supernatant liquid. Wash the precipitate by affusion and decantation of a mixture of simple syrup and distilled water (recently boiled to expel air) in the proportion of thirty cubic centimeters (1 fluidounce) syrup to each four hundred and eighty cubic centimeters (16 fluidounces) of water, until all saline taste has been washed away. Drain the precipitate on flannel, and press out the remainder of the water as far as possible. Then add thirty-eight grams (1 ounce 150 grains) clarified honey and twenty-five grams (386 grains) sugar, in coarse powder, and mix the whole in a porcelain evaporating dish. Finally, put the dish on a water-bath and evaporate the mixture, stirring continuously, until the total product weighs one hundred grams (3 ounces 230 grains).

The preparation is like the pilula ferri carbonatis of 1870.

Dose.—0.1 to 0.3 gram (2 to 5 grains).

FERRI CARBONATIS PILULÆ BLAUDII.

BLAUD'S PILLS OF CARBONATE OF IRON.

Mix twenty-five grams (386 grains) ferrous sulphate, twenty-five grams (386 grains) potassium carbonate, and four grams (62 grains) powdered acacia with enough water and simple syrup to form a proper pill mass, from which make one hundred pills.

The potassium carbonate and the sulphate of iron should first be rubbed up with a little water until effervescence ceases, and simple syrup added afterward to form the mass.

Ferri Chloridum; U. S.

CHLORIDE OF IRON.

Ferricum Chloridum—Ferric Chloride, Sesquichloride of Iron, Perchloride of Iron.

Description and Tests.—See the Pharmacopœia, page 155.

Solid crystalline pieces of irregular form; orange-yellow; deliquescent; smells faintly of hydrochloric acid. It dissolves readily and without residue in water, alcohol, or ether.

Must not give off noticeable vapors of hydrochloric acid in the air.

Medicinal Properties.—It coagulates blood, insoluble compounds being formed with the protein substances. It is therefore a powerful hæmostatic. It is not used for internal administration.

FERRI CHLORIDI LIQUOR; U. S.

SOLUTION OF CHLORIDE OF IRON.

Solutio Ferrici Chloridi—Solution of Ferric Chloride, Solution of Muriate of Iron, Solution of Sesquichloride of Iron, Solution of Perchloride of Iron.

Preparation.—Put one hundred and fifty grams (5 ounces 127 grains) of cut iron wire into a half-gallon flask or jar. Add five hundred and forty grams (19 ounces 20 grains) hydrochloric acid, diluted with two hundred and fifty grams (8½ fluidounces) of distilled water. Let stand until effervescence has ceased. Bring it to the boiling point. Filter, rinsing the vessel with boiling distilled water, which is to be put through the same filter and mixed with the solution. Add two hundred and seventy grams (9 ounces 230 grains) hydrochloric acid to the filtrate. Put eighty grams nitric acid into a half-gallon or one-gallon porcelain evaporating dish. Add to it very gradually, and with uninterrupted

stirring, the green iron solution. After effervescence has ceased put the dish on a sand-bath and apply heat until all nitrous odor has disappeared.

If the solution now does not give a blue color with freshly prepared test-solution of ferricyanide of potassium it is ready; if, on the other hand, it strikes a blue color with that reagent, add a little more nitric acid and then heat again until free from nitrous odor.

At last add fifty grams (1 ounce 334 grains) hydrochloric acid, and then enough distilled water to make the final product weigh one thousand grams (35 ounces 120 grains).

The iron wire dissolves pretty rapidly at first, and it is necessary to be cautious in adding the acid, in order that the liquid may not boil over from the violent evolution of gas, especially if the flask or jar used is small. At the last, however, the application of heat is necessary to completely saturate the acid with iron.

The oxidation with nitric acid is best carried out at about the boiling point of water. Care must be taken to avoid the poisonous red fumes during the oxidation. The oxidation is considerably facilitated by boiling down the green solution of ferrous chloride to about two-thirds its bulk before adding it to the nitric acid, but the frothing is then more violent.

Description and Tests.—See the Pharmacopœia, page 197. Reddish-brown, clear; has a faint odor of hydrochloric acid when cold, plainly noticed when warm, but free from nitrous odor or from the odor of chlorine. It has a strongly styptic and acid taste, and acid reaction. Its specific gravity is 1.405, corresponding to very nearly 42° Baumé.

The official solution of chloride of iron contains an excess of hydrochloric acid, amounting to five per cent. The object of this is to cause the formation of chlorinated ethereal compounds (chloride of ethyl, etc.) in the tincture of chloride of iron, which is made from it. The presence of these ethereal compounds is insisted upon and highly valued by many physicians. A small quantity of free acid is always necessary also in order to prevent precipitation in the tincture.

Strength.—Ten grams ($154\frac{3}{10}$ grains) of this solution, when precipitated with an excess of ammonia, gives a precipitate which after washing, drying, and ignition should weigh 1.86 gram (28.70 grains). It contains 37.8 per cent. anhydrous ferric chloride, corresponding to 18.6 per cent. ferric oxide, or to 12.6 per cent. metallic iron. It is thus about two per cent. stronger than the preparation of 1870.

Sold in the market at present by the pint, in one-pint and five-pint bottles.

One pint solution of the chloride of iron, of the standard strength of 1870, weighs twenty-two and six-tenths ounces ; one pint of the strength of the present Pharmacopœia weighs twenty-three and eight-tenths ounces. A twelve-ounce acid bottle will hold over one pound avoirdupois. One gallon of the new preparation weighs eleven pounds eleven and one-third ounces.

Medicinal Uses.—This is a valuable styptic and astringent, useful in *passive hemorrhages.* It can be given internally in *hemorrhages* from the *stomach, bowels, uterus,* or *bladder,* etc., or applied locally in dilution in *postpartum hemorrhage,* or bleeding from any cause, as from *cancer of uterus, hemorrhoids, extraction of teeth, nose-bleeding,* etc. In *hemorrhage from the lungs* it has been employed in the form of spray.

Used chiefly for making tincture of chloride of iron.

Dose.—0.05 to 0.5 cubic centimeter (1 to 8 minims) largely diluted with water.

"PRAVAZ'S SOLUTION OF PERCHLORIDE OF IRON"

is a solution of ferric chloride with but a slight excess of hydrochloric acid, and having the specific gravity 1.26 (30° Baumé).

LIQUOR FERRI SESQUICHLORATI,

the solution of ferric chloride of the old German Pharmacopœia, contains about forty-three and one-half per cent. anhydrous ferric chloride (or about 15 per cent. iron) and has the specific gravity 1.480 to 1.484 (about 47° Baumé). It does not contain more than a trifling excess of hydrochloric acid.

The solution of chloride of iron of the new German Pharmacopœia has the specific gravity 1.28, and contains ten per cent. iron.

LIQUOR FERRI PERCHLORIDI FORTIOR; B.

Strong Solution of Perchloride of Iron.

This is the British solution of ferric chloride, and has the specific gravity 1.44 (44½° Baumé), being about ten per cent. stronger than the solution of chloride of iron of our Pharmacopœia, and, like the German preparation, contains no great amount of free hydrochloric acid.

SOLUTIO CHLORETI FERRICI

of the Scandinavian pharmacopœias is prepared by dissolving the solid crystalline ferric chloride in an equal weight of distilled water. It has the specific gravity 1.30 (about 33½° Baumé), and contains about thirty per cent. anhydrous ferric chloride, or about ten per cent. iron. This is

readily prepared, and is useful not only as an iron preparation for internal use, but also as a hæmostatic.

The French *solution de perchlorure de fer* has the specific gravity 1.26 (30° Baumé), being identical with Pravaz's solution; and the Spanish *solucion de cloruro ferrico-hemostatica* (or "per-cloruro de hierro liquido") is also of the same strength.

MARTIN'S HEMOSTATIC

consists of fine soft pieces of spunk saturated with Pravaz's solution.

ADRIAN'S HEMOSTATIC

is a solution of thirty grams (1 ounce) common table salt in one hundred and twenty cubic centimeters (4 fluidounces) water, with fifty grams (1 ounce 334 grains, or $1\frac{1}{3}$ fluidounce) Pravaz's solution added.

HEMOSTATIC COTTON.

Gossypium Hæmostaticum.

Is absorbent cotton dipped in Pravaz's solution, pressed, and dried.

FERRI CHLORIDI TINCTURA; U. S.

TINCTURE OF CHLORIDE OF IRON.

Tinctura Ferrici Chloridi—Tincture of Ferric Chloride, Tincture of Muriate of Iron, Tincture of Sesquichloride of Iron, Tincture of Perchloride of Iron, Muriated Tincture of Iron; Eisenchloridtinktur, G.; *Teinture de perchlorure de fer*, F.; *Tinctura de cloruro ferrico*, Sp.; *Jernkloridtinktur*, Sw.

Mix three hundred and fifty grams (12 ounces 150 grains) solution of chloride of iron with six hundred and fifty grams (22 ounces 406 grains) of alcohol, and let the mixture stand in a tightly covered vessel for at least three months, after which the liquor is to be transferred to glass-stoppered bottles.

[Three hundred and fifty grams solution of chloride of iron measures about two hundred and fifty cubic centimeters (about $8\frac{1}{2}$ fluidounces), and six hundred and fifty grams alcohol measures about eight hundred and two cubic centimeters (about $27\frac{1}{3}$ fluidounces), so that the proportions by measure are about five to sixteen. The proportions by measure in the tincture of chloride of iron of the old Pharmacopœia (1870) were five to fifteen. The solution of chloride of iron of 1880 is, however, stronger than that of 1870, so that the strength of the two tinctures is about equal.]

As already stated, the solution of chloride of iron contains five per cent. free hydrochloric acid. This, when in contact with the alcohol for "at least three months," produces chlorinated ether compounds, which give the preparation an ethereal odor. This is specifically intended by the Pharmacopœia. Even the tincture of chloride of iron of the former Pharmacopœia was intended to contain the ethereal compounds; but the three months' standing before being used was not prescribed as now, and hence the ethereal odor which should belong to the preparation was not generally met with in it. In fact most of the tincture of chloride of iron in the market is not even made with strong alcohol as required, and hence will not acquire the ethereal odor, no matter how long it may stand.

Properties and Strength.—See the Pharmacopœia, page 344. It is a clear, brownish liquid, of an ethereal odor, and an astringent, acid, styptic taste. Reaction acid. Its specific gravity is 0.988. Hence one pint of it weighs sixteen and forty-seven one-hundredths ounces, and one gallon weighs eight pounds three and three-fourths ounces. It contains about three and one-fourth per cent. of anhydrous ferric chloride, corresponding to about 4.4 per cent. metallic iron.

Ten grams (154$\frac{3}{10}$ grains) of the tincture precipitated with an excess of ammonia should yield a precipitate which, after washing, drying, and ignition, should weigh 65.2 centigrams (or 10 grains).

If one pint of the tincture at 15° C. (59° F.) weighs more than sixteen and one-half avoirdupois ounces [or if its specific gravity is higher than 0.988], while the proper percentage of iron is present, and if the ethereal odor is wholly absent, then the preparation is not up to the pharmacopœial standard, but probably made with diluted alcohol, as the commercial article generally is.

Sold at present by the pint in pint and five-pint bottles.

Medicinal Uses.—Chalybeate tonic and astringent. Very frequently employed when iron preparations are indicated. It is one of the best preparations of iron as an astringent in *passive hemorrhages*, especially from the *uterus*.

Large doses of this tincture with quinine are very efficient in *diphtheria, renal dropsies, albuminuria, and erysipelas*.

Externally it is often used as a styptic.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims) two or three times a day, diluted with water. This solution should be taken through a straw or glass tube, and the mouth rinsed afterward with clear water, to prevent injury to the teeth.

FERRI CHLORIDI TINCTURA CREUSII.

CREUSE'S TASTELESS TINCTURE OF IRON.

Put three hundred grams (10 ounces 255 grains) citric acid in two hundred and fifty cubic centimeters (8½ fluidounces) distilled water; heat to the boiling point, and neutralize with five hundred and fifty grams (20 ounces) sodium carbonate, or as much as may be necessary. Mix the solution with two hundred and fifty cubic centimeters (8½ fluidounces) solution of chloride of iron (prepared without an excess of hydrochloric acid), and then add enough alcohol to make the whole measure one thousand cubic centimeters (34 fluidounces).

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

CHLORETI FERRICI SOLUTIO SPIRITUOSA; Sw.

SPIRITUOUS SOLUTION OF FERRIC CHLORIDE.

Made by dissolving ferric chloride (crystalline chloride of iron) in nine times its weight of diluted alcohol.

This preparation is, in fact, a tincture of chloride of iron containing about six per cent. anhydrous chloride, corresponding to 2.07 per cent. of metallic iron. Being made with diluted alcohol, and without much free acid, it contains scarcely any ethereal compounds. It is somewhat less than one-half the ferric strength of the official tincture.

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims).

FERRI CHLORIDI TINCTURA ÆTHEREA.

ETHEREAL TINCTURE OF CHLORIDE OF IRON.

Solutio Ferrosi Chloridi Spirituoso-Ætherea; Tinctura Ferri Chlorati Ætherea, G.; *Tinctura Tonico-Nervina Bestuscheffii, Liquor Anodynus Martialis, Tinctura Aurea de la Mottii, Tinctura Martis Klaprothii.*

This old, once celebrated, and to this day valued preparation, may be best prepared as follows:

Dissolve thirty grams (1 ounce 25 grains) chloride of iron in thirty cubic centimeters (1 fluidounce) water, in a pint bottle; add two hundred and eighty grams (7 ounces 178 grains) ether (about 9½ fluidounces). Cork the bottle and shake the contents well together. Let stand twenty-four hours. Pour off the clear ethereal liquid (separating the last by means of a separatory funnel), and then mix it with three hundred and

sixty grams (12 ounces 305 grains) alcohol (measuring about 14⅞ fluid-ounces). Pour the mixture into a half-gallon acid bottle, put in the glass stopper, and set the bottle in the sunlight. The bottle must be occasionally shaken. Let stand in that way until the yellow color disappears entirely. Then set it in a shady place, removing the stopper frequently, until the yellow color returns.

Keep the preparation in a well-closed glass-stoppered bottle, in a dark place.

It has the same strength as the preparation of the old German Pharmacopœia, which is made from solution of chloride of iron of 1.482 specific gravity.

It contains ferrous chloride, basic ferric chloride, ethyl chloride, aldehyd, and hydrochloric acid.

Medicinal Uses.—Tonic and antispasmodic. Used with advantage in *chlorosis, hysteria, hypochondriasis, paralysis*, etc.

Dose.—One to two cubic centimeters (15 to 30 minims) taken in sweetened or aromatic water, or in some wine.

Ferri Chloridum Viride.

GREEN CHLORIDE OF IRON.

Ferrosum Chloridum—Ferrous Chloride, Proto-chloride of Iron.

Put forty-five grams (1½ ounce) of cut iron wire into a one-quart chemical flask, and add to it a mixture of one hundred and seventy-five grams (6 ounces) hydrochloric acid and ninety cubic centimeters (3 fluid-ounces) water. When effervescence ceases, heat it to the boiling point; filter while hot, rinse the flask and residue of iron wire with hot water, and pass the washings through the same filter, and evaporate it down until a sample crystallizes on cooling. Set aside in a covered dish in a cool place that crystals may be formed. Remove the crystals from the mother liquor and drain them in a glass funnel, after which dry them hastily and put them into a glass-stoppered bottle.

Description.—Ferrous chloride is in clear green crystals, which soon become brown from ferric salt.

An aqueous solution which contains ten per cent. iron (or about twenty-five and one-half per cent. ferrous chloride) has about the specific gravity 1.23. A solution of about this strength was official in the old German Pharmacopœia; it contained also one-tenth per cent. official hydrochloric acid.

Medicinal Uses.—Similar to those of the other astringent iron preparations.

Dose.—0.05 to 0.1 gram (1 to 2 grains).

FERRI CHLORIDI VIRIDIS SYRUPUS.

SYRUP OF GREEN CHLORIDE OF IRON.

Ferrosi Chloridi Syrupus—Syrup of Ferrous Chloride.

Dilute the filtered solution of green chloride of iron, obtained as described under "Ferri Chloridum Viride," until it weighs three hundred and fifty grams (12⅓ ounces); then dissolve it in six hundred and fifty grams (23 ounces) sugar, strain, and finally add enough boiling water to make the whole weigh one thousand grams (35⅓ ounces).

Contains about ten per cent., by weight, of ferrous chloride.

Dose.—0.5 to 3 cubic centimeters (10 to 50 minims).

FERRI CHLORATI TINCTURA; G.

TINCTURE OF FERROUS CHLORIDE.

Dissolve twenty-five grams (386 grains) freshly prepared ferrous chloride (see "Ferri Chloridum Viride") in a mixture of one hundred and fifty grams (6¼ fluidounces) alcohol, seventy-five grams (2½ fluidounces) water, and one gram (15 grains) hydrochloric acid.

Dose.—0.5 to 1 cubic centimeter (8 to 15 minims).

Ferri Citras; U. S.

CITRATE OF IRON.

Ferricus Citras—Ferric Citrate.

Preparation, Description, and Tests.—See the Pharmacopœia, page 156.

Scale salts cannot well be made except by manufacturers.

Beautiful, transparent, garnet-red scales, devoid of odor, but having a slightly acid and ferruginous taste. It dissolves slowly but completely in cold water, and very readily in boiling water. The aqueous solution is darkened by ammonia. In alcohol it is insoluble.

Should be kept in a shady, cool place, and in well-closed bottles.

Medicinal Uses.—Salts of iron with vegetable acids are less astringent and less liable to derange the digestion than salts of iron with mineral acids. They are therefore tolerated by patients who might not be able to take the more active preparations. Citrate of iron is a mild chalybeate tonic, suitable for delicate patients.

Dose.—0.3 to 1.3 gram (5 to 20 grains).

FERRI CITRATIS LIQUOR; U. S.

SOLUTION OF CITRATE OF IRON.

Solutio Ferrici Citratis—Solution of Ferric Citrate.

Mix eight hundred and forty grams (29 ounces 277 grains) water of ammonia with two liters (68 fluidounces) cold water in a four-gallon jar. Add to this, with constant stirring, ten hundred and fifty grams (37 ounces 17 grains) solution of tersulphate of iron, previously diluted with ten liters (about 21.1 pints) of water. Pour the mixture containing the precipitate on a wetted muslin strainer and let drain. Put the precipitate back in the jar, and stir it up with twelve liters (25⅓ pints) water, and again pour this on a strainer and let it drain. Repeat the washing and draining in the same manner until the washings cease to give a heavy cloudiness with barium chloride solution. Then let the water drain away thoroughly. Put the moist precipitate into a porcelain evaporating dish, add three hundred grams (10 ounces 255 grains) citric acid, and heat gently (not above 60° C., or 140° F.), stirring constantly until solution is effected. Filter the solution, and evaporate it down until it weighs one thousand grams (35 ounces 120 grains), not allowing the temperature to exceed 60° C. (140° F.).

Description and Strength.—See the Pharmacopœia, page 198. Dark brown, odorless, slightly styptic, and a little acid to the taste. Has a specific gravity of 1.26, corresponding to 30° Baumé. It contains about 35.5 per cent. anhydrous ferric citrate. When spread on glass plates and allowed to evaporate spontaneously the solution yields from forty-three to forty-four per cent. of scales of citrate of iron, which when incinerated leave at least twenty-five per cent. residue (11 per cent. of the weight of the solution).

It is of about the same strength as that of 1870.

Practically the solution of citrate of iron contains about the same amount of metallic iron as the solution of tersulphate of iron, although the official formula prescribes the use of one hundred and five parts of the latter to make one hundred parts of the former.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

FERRI CITRATIS VINUM; U. S.

WINE OF CITRATE OF IRON.

Dissolve forty grams (1 ounce 180 grains) citrate of iron and ammonium in seven hundred and twenty grams (25 ounces 174 grains, or about 26 fluidounces) stronger white wine (see page 1022), and add one hundred and twenty grams (4 ounces 100 grains, or about 5 fluid-

ounces) tincture of sweet orange peel, and one hundred and twenty grams (4 ounces 100 grains, or about 3¼ fluidounces) simple syrup. Filter.

This preparation is new to the Pharmacopœia. Each five cubic centimeters (1 teaspoonful) of it contains about twenty centigrams (or 3 grains) of citrate of iron and ammonium. It resembles the preparations sold under the name of "Sweet Wine of Iron."

Dose.—Four to fifteen cubic centimeters (1 to 4 fluidrachms).

Ferri Emplastrum; U. S.

Iron Plaster.

Strengthening Plaster.

Melt together thirty grams (1 ounce) Canada turpentine, thirty grams (1 ounce) Burgundy pitch, and two hundred and ten grams (7 ounces) lead plaster, and then incorporate thoroughly with the mixture thirty grams (1 ounce) of freshly precipitated hydrated oxide of iron dried at a heat not exceeding 80° C. (176° F.). Stir constantly, keeping the vessel on the water-bath, until the plaster thickens when cold.

This is an improvement on the old iron plaster of the Pharmacopœia of 1870, which was made with subcarbonate of iron, and was not as smooth as the new preparation. Both are probably of no value except as coverings.

Ferri et Ammonii Acetatis Mixtura; U. S.

Mixture of Acetate of Iron and Ammonium.

Basham's Mixture.

Mix one hundred grams (3 ounces 230 grains, or about 3⅓ fluidounces) solution of acetate of ammonium with fifteen grams (about ½ fluidounce) diluted acetic acid; add ten grams (154 grains) tincture of chloride of iron, fifty grams (1 ounce 334 grains, or about 1½ fluidounce) elixir of orange, seventy-five grams (2 ounces 282 grains, or about 2 fluidounce) simple syrup, and two hundred and fifty cubic centimeters (8½ fluidounces) water.

Dose.—Four to fifteen cubic centimeters (1 to 4 fluidrachms).

Ferri et Ammonii Citras; U. S.

Citrate of Iron and Ammonium.

Ammonio-Ferricus Citras—Ammonio-Ferric Citrate, Soluble Citrate of Iron.

Preparation, Description, and Tests.—See the Pharmacopœia, page 156. Resembles citrate of iron. In damp air the scales become

soft, deliquesce, or cake together. It has a slightly saline, mildly ferruginous taste, and neutral reaction. Is very readily soluble in water without residue. The aqueous solution is darkened by ammonia. Insoluble in alcohol. With solution of potassa it gives off vapors of ammonia.

Should not be of a smoky dark brown, but garnet red. Must be kept in well-corked bottles in a cool, shady place.

Used like citrate of iron.

Dose.—0.3 to 1.3 gram (5 to 20 grains).

Ferri et Ammonii Sulphas; U. S.

Sulphate of Iron and Ammonium.

Ammonio-Ferricus Sulphas—Ammonio-Ferric Sulphate, Ammonio-Ferric Alum.

Description and Tests.—See the Pharmacopœia, page 157. Pale violet transparent crystals, which whiten on exposure. Soluble in three times its weight of water at ordinary temperatures, and in less than its own weight of boiling water. Insoluble in alcohol. Must be kept in well-corked bottles.

Medicinal Uses.—An astringent chalybeate, useful in relaxed conditions of the mucous membranes, as in *leucorrhœa*, etc.

Dose.—0.25 to 1 gram (4 to 15 grains).

Ferri et Ammonii Tartras; U. S.

Tartrate of Iron and Ammonium.

Ammonio-Ferricus Tartras—Ammonio-Ferric Tartrate.

Preparation, Description, and Tests.—See the Pharmacopœia, page 158.

The quantity of tartaric acid prescribed in the Pharmacopœia is nearly three times as much as it should be. The preparation is, however, not made except by manufacturers.

Transparent garnet-red to yellowish-brown scales, slightly deliquescent, inodorous, sweetish, slightly ferruginous. Reaction neutral. Readily soluble in water. Insoluble in alcohol. Like the other scale salts of iron it should be kept in a cool, dark place, and in well-corked bottles.

Medicinal Uses.—Similar to those of the other combinations of iron with vegetable acids.

Dose.—0.5 to 2 grams (8 to 30 grains).

Ferri et Cinchonidinæ Citras.

CITRATE OF IRON AND CINCHONIDINE.

This is a scale preparation of iron resembling the citrate of iron and quinine in appearance, but containing cinchonidine instead of quinine.

Dose.—0.1 to 0.5 gram (2 to 8 grains) in solution or pill.

Ferri et Potassii Tartras; U. S.

TARTRATE OF IRON AND POTASSIUM.

Potassio-Ferricus Tartras—Potassio-Ferric Tartrate.

Preparation, Description, and Tests.—See the Pharmacopœia, page 159.

Made only by manufacturers.

Dark garnet-red scales, slightly deliquescent, odorless, sweetish, slightly ferruginous. Readily soluble in water. The aqueous solution is darkened by the addition of water of ammonia. Insoluble in alcohol.

Must be kept in well-corked bottles in a dark place.

Medicinal Uses.—A mild chalybeate tonic, pleasant to the taste, easily tolerated by the stomach, not apt to derange the digestion or constipate.

Dose.—0.25 to 2 grams (4 to 30 grains).

GLOBULI MARTIALES

were hard balls of tartrate of iron and potassium made by boiling iron with cream of tartar, filtering the solution, and evaporating until of the right consistence to form the *boli*.

Ferri et Quininæ Citras; U. S.

CITRATE OF IRON AND QUININE.

Quinino-Ferricus Citras—Quinino-Ferric Citrate.

Preparation, Description, and Tests.—See the Pharmacopœia, page 159.

Prepared only by manufacturing chemists.

Reddish-brown scales, transparent, slowly deliquescent, odorless, bitter, mildly ferruginous. Reaction slightly acid. Entirely soluble in water. On heating the solution with solution of potassa no vapors of ammonia should be evolved.

Must contain twelve per cent. of the alkaloid quinine. The preparation of 1870 contained about sixteen per cent.

Should be kept in well-corked bottles in a dark, cool place.

Medicinal Uses.—A mild chalybeate, to which are added the tonic effects of a vegetable bitter.

Dose.—About 0.1 to 0.5 gram (2 to 8 grains) in solution or pill.

FERRI ET QUININÆ CITRATIS LIQUOR; U. S.

SOLUTION OF CITRATE OF IRON AND QUININE.

Dissolve sixty-five grams (2 ounces 127 grains) citrate of iron and ammonium in two hundred cubic centimeters (6¾ fluidounces) of distilled water, in a weighed porcelain evaporating dish. Heat the solution on a water-bath to 60° C. (140° F.), and add twenty-eight grams (432 grains) citric acid. When this has dissolved, add 12 grams (185 grains) alkaloid quinine, previously dried at 100° C. (212° F.), until it ceases to lose weight, and stir the whole until perfect solution is effected. Evaporate the solution until it weighs one hundred and sixty grams (5 ounces 280 grains), let it cool, add thirty grams (1¼ fluidounce) alcohol, and then enough distilled water to make the whole weigh two hundred grams (7 ounces 24 grains).

This is a handsome-looking greenish-yellow, or brownish-yellow solution, which keeps very well. It contains six per cent. quinine; 2 grams (30 grains) of the solution contains sixty-five centigrams (10 grains) citrate of iron and ammonium, and twelve centigrams (very nearly 2 grains) of quinine.

Uses.—For making bitter wine of iron.

Ferri et Quininæ et Strychninæ Citras.

CITRATE OF IRON, QUININE, AND STRYCHNINE.

This is a scale salt consisting of citrate of iron and quinine with one per cent. of strychnine added.

Used like citrate of iron and strychnia.

Dose.—0.05 to 0.25 gram (1 to 4 grains).

Ferri et Strychninæ Citras; U. S.

CITRATE IRON AND STRYCHNINE.

Strychnino-Ferricus Citras—Strychnino-Ferric Citrate.

Preparation, Description, and Tests.—See the Pharmacopœia, page 160.

Made by manufacturers only.

Transparent, garnet red, deliquescent, odorless, bitter, slightly ferruginous. Reaction acid. Readily and completely soluble in water. Insoluble in alcohol.

Contains one per cent. of the alkaloid strychnine, as did also the preparation of 1870. Keep it in well-corked bottles in a cool, dark place.

Medicinal Uses.—A mild chalybeate, to which are added the tonic effects of strychnine.

Dose.—0.05 to 0.1 gram (1 to 2 grains), which may be carefully increased to 0.2 to 0.3 gram (3 to 5 grains).

Ferri Ferrocyanidum.

Ferrocyanide of Iron.

Prussiate of Iron—Prussian Blue.

Medicinally pure ferrocyanide of iron is prepared by precipitating a solution of ferric salt with ferrocyanide of potassium, taking care to leave an excess of ferric salt undecomposed, using very dilute solutions, and washing the precipitate thoroughly.

It is a dark-blue powder, insoluble in water or in alcohol, odorless and tasteless. Soluble in a solution of oxalic acid.

Medicinal Uses.—Chalybeate tonic ; said to be also anti-periodic.

Dose.—0.2 to 0.4 gram (3 to 6 grains).

BLUE INK

may be made by dissolving freshly precipitated ferrocyanide of iron in a solution of oxalic acid in water. An excess of oxalic acid defeats the end in view and must be washed away before a proper ink can be obtained. Gum arabic is added to impart body and gloss to the ink.

Ferri (Hydratis) Dialysati Liquor.

Dialyzed Iron.

Mix nine liters (19 pints) solution of chloride of iron of 1.44 specific gravity (Liquor Ferri Perchloridi Fortior, p. 469), with thirty liters (about 8 gallons) of water in an earthenware jar of twenty gallons' capacity. Then add, during constant stirring, enough water of ammonia to precipitate all the iron and render the liquid alkaline, which will require in the neighborhood of twelve liters ($25\frac{1}{3}$ pints). Let the precipitate settle. Then draw off the supernatant liquid by means of a siphon. Wash by repeatedly filling the jar with fresh lots of distilled water, drawing off the washings each time by the siphon, after the precipitate has subsided, until at last the washings fail to give any precipitate with nitrate of silver solution. Then transfer the precipitate (ferric hydrate) to a muslin strainer and let it drain. Express the remaining

water by strong pressure. Then put the cake of moist ferric hydrate into a jar with one liter (2 pints and $1\frac{3}{4}$ fluidounce) of the same strength and kind of solution of chloride of iron as previously used (Liquor Ferri Chloridi Fortior) and stir well together with a porcelain stirrer. Let stand a day or two, stirring frequently. Then put the mixture into dialysers, changing the water in the outer vessels frequently. In from nine to twelve days the preparation will be found free from styptic taste, clear, and ready for use.

Unless the solution of chloride of iron is perfectly free from ferrous salt, and the ferric hydrate thoroughly washed, the preparation will not be satisfactory. The official solution of chloride of iron cannot be used at all for this purpose, as it contains a large excess of free hydrochloric acid, only nine-tenths being treated with ammonia.

At best dialyzed iron is of uncertain strength and composition. It is usual to make it so that it contains exactly five per cent. of solid matters. To adjust it to this strength a weighed sample must be evaporated to dryness, and the residue also weighed, after which the preparation is evaporated or diluted, as the case may require, until of proper strength.

The preparation contains basic chloride of iron (oxy-chloride of iron)—not "oxide of iron," as frequently stated.

Dialyzed iron must be kept in a moderately warm place. In winter it will freeze if shipped carelessly in cold weather. The addition of glycerin will, however, prevent this. Freezing destroys it, even if the bottle should not burst.

Medicinal Uses.—Used as a chalybeate in *anæmia*. It does not possess the disagreeable styptic taste of many of the other iron preparations, and is easily tolerated by even a delicate stomach. It is, however, not as active or certain as some other iron preparations, and is not as much used as it was a few years ago.

It has been given as an *antidote for arsenic*, but the hydrated oxide of iron with magnesia is a better preparation for this purpose.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims), diluted with sweetened water, several times daily.

FERRUM DIALYSATUM IN LAMELLIS.

Dialyzed Iron in Scales.

Evaporate solution of dialyzed iron to a syrupy consistence at not over 60° C. (140° F.), and then scale it on glass plates.

Reddish-brown scales, containing about seventy-five per cent. iron. It is not completely soluble in water.

Dose.—0.05 to 0.3 gram (1 to 5 grains).

Ferri Hypophosphis; U. S.

HYPOPHOSPHITE OF IRON.

Ferricus Hypophosphis—Ferric Hypophosphite.

A white or grayish-white powder, odorless, almost tasteless, insoluble in water. Dissolves readily in a dilute solution of hypophosphorous acid or hydrochloric acid. With solution of citrate of sodium it makes a clear green solution.

Medicinal Uses.—It is doubtful whether this salt possesses any virtues other than the chalybeate effects of iron salts in general. It has been supposed to exert the effects of phosphorus in addition to those of iron.

Dose.—0.25 to 0.5 gram (4 to 8 grains).

FERRI HYPOPHOSPHITIS SYRUPUS.

SYRUP OF HYPOPHOSPHITE OF IRON.

Dissolve thirteen grams (200 grains) hypophosphite of iron in thirty cubic centimeters (1 fluidounce) solution of citrate of sodium, and then add a sufficient quantity of syrup of orange flowers to make the whole measure one liter (34 fluidounces).

Contains about 6.5 centigrams hypophosphite of iron in each five cubic centimeters (1 grain to each teaspoonful).

The syrup has a greenish tint.

Dose.—About five cubic centimeters (teaspoonful).

Ferri Iodidum.

IODIDE OF IRON.

Ferrosum Iodidum—Ferrous Iodide.

Steel-gray crystalline masses, of a metallic lustre, and having the odor of iodine. It is deliquescent, readily soluble in water, forming a green solution. Also soluble in glycerin.

It does not keep well, oxidizing, losing iodine, gradually acquiring a rusty color and becoming partially insoluble.

Medicinal Uses.—Not used in this form, but often given in pill form, or as syrup of iodide of iron, and saccharated iodide of iron, all of which preparations are more uniform and eligible. Frequently employed as an alterative chalybeate tonic in *anæmia* and *glandular swellings*, in scrofulous patients, in *scrofulous* and *tuberculous complaints*, etc.

FERRI IODIDUM SACCHARATUM; U. S.

SACCHARATED IODIDE OF IRON.

Ferrosum Iodidum Saccharatum—Saccharated Ferrous Iodide.

Mix thirty grams (1 ounce) iron wire, cut into small pieces, and eighty-five grams (3 ounces) of iodine with one hundred cubic centimeters (3⅓ fluidounces) distilled water in a thin glass flask. Shake the mixture occasionally until the reaction ceases and the solution becomes green and loses the odor of iodine. To thoroughly complete the reaction, so as to produce a pure clear green color, it may be found necessary to bring the contents of the flask to the boiling point by heating on a sand-bath. Put two hundred grams (7 ounces 24 grains) sugar of milk into a porcelain evaporating dish. Filter the solution of iodide of iron into the sugar of milk, rinsing the flask with a little distilled water, and passing this also through the same filter into the sugar of milk. Mix well, and evaporate on a water-bath during constant stirring until dry. Then transfer the dry mass to a heated iron mortar containing two hundred grams (7 ounces 24 grains) more of sugar of milk and reduce the whole to powder. Transfer the powder at once to small, well-dried bottles (about 50-gram bottles, or 2-ounce bottles), and cork them at once with corks dipped into melted paraffine or wax.

Must be kept in a cool, dark place.

It is a grayish powder which quickly absorbs moisture from the air if exposed. Odorless. Taste sweetish, ferruginous. Reaction slightly acid. Soluble in seven parts of water, forming an almost clear solution.

This preparation is new to the Pharmacopœia of the United States. It is a very good preparation, much to be preferred to the iodide of iron without the milk-sugar, as it keeps much better.

Dose.—0.15 to 0.5 gram (2 to 8 grains) several times daily.

FERRI IODIDI PILULÆ; U. S.

PILLS OF IODIDE OF IRON.

"Blancard's Pills."

Put four grams (62 grains) reduced iron in a porcelain capsule; add eight grams (120 grains) water, and gradually, 5.20 grams (81 grains) iodine. Triturate until the reaction has ceased, and the mixture has acquired a greenish instead of a reddish tint. Then add 3.25 grams (about 50 grains) powdered glycyrrhiza, 3.25 grams (50 grains) powdered sugar, 0.75 gram (11½ grains) powdered extract of glycyrrhiza, and 0.75 gram (11½ grains) powdered acacia, previously mixed together. Evaporate the whole on a water-bath until reduced to a proper pilular consistence, and then divide it into one hundred pills.

Dissolve balsam of tolu in an equal weight of stronger ether, and shake the pills with a sufficient quantity of the solution to coat them uniformly. Put them on a plate, stirring occasionally until dry.

Keep the pills in well-corked bottles. Must not have any odor of iodine.

Dose.—One to five pills during the day.

FERRI IODIDI SYRUPUS; U. S.

SYRUP OF IODIDE OF IRON.

Ferrosi Iodidi Syrupus—Syrup of Ferrous Iodide.

Put twenty-five grams (386 grains) cut iron wire into a thin glass flask of about two liters (one-half gallon) capacity; add two hundred cubic centimeters (6⅔ fluidounces) distilled water, and then eighty-two grams (2 ounces 390 grains) iodine. Shake the mixture occasionally until the reaction ceases and the solution has acquired the characteristic green color and the odor of iodine has ceased. Put six hundred grams (21 ounces 72 grains) sugar, in coarse powder, into a porcelain evaporating dish. Filter the solution of iodide of iron into the sugar. Stir the mixture with a glass or porcelain rod or spatula, and heat it to the boiling point on a sand-bath, taking care not to burn the sugar. Strain the syrup through linen into a tared bottle, and add enough distilled water to make the whole product weigh one thousand grams (35 ounces 120 grains).

Contains ten per cent. ferrous iodide.

Description and Tests.—See the Pharmacopœia, page 323.

Must be kept in bottles not larger than five hundred grams (17⅔ avoirdupois ounces) capacity, entirely filled, well corked, and may be safely kept in a place accessible to daylight. Does not keep well in larger bottles.

Dose.—One to four cubic centimeters (15 to 60 minims).

Ferri Lactas; U. S.

LACTATE OF IRON.

Ferrosus Lactas—Ferrous Lactate.

Description and Tests.—See the Pharmacopœia, page 162. A pale yellowish-green granular powder, or crystalline crusts. Odorless; taste sweetish, mildly ferruginous. Soluble in forty parts of water at ordinary temperatures; in twelve parts of boiling water.

Must be kept in well-corked bottles. Should not be brownish, nor have a cheesy odor. Used like other mild salts of iron.

Dose.—0.1 to 0.5 gram (2 to 8 grains) in pill.

Ferri Lactophosphatis Syrupus.

SYRUP OF LACTOPHOSPHATE OF IRON.

Dissolve thirteen grams (200 grains) soluble phosphate of iron (U. S. Phar. 1880) in sixty cubic centimeters (2 fluidounces) hot distilled water, then add nine hundred and thirty cubic centimeters (31½ fluidounces) syrup of orange flowers, and ten grams (154 grains) lactic acid.

This syrup is very pleasant to the taste.

It contains 6.5 centigrams phosphate of iron, with free lactic acid to each five cubic centimeters (1 grain to each teaspoonful).

Dose.—About five cubic centimeters (one teaspoonful).

Ferri Mistura Composita; U. S.

COMPOUND IRON MIXTURE.

Griffith's Mixture—Emulsio Myrrhæ Ferrata.

Triturate nine grams (139 grains) myrrh, in small selected tears, nine grams sugar, and four grams (62 grains) carbonate of potassium, with four hundred and fifty cubic centimeters (15¼ fluidounces) rose-water gradually added. Then add to the emulsion twenty-five grams (500 minims) spirit of lavender. Pour the mixture into a bottle, and finally add three grams (46 grains) sulphate of iron, and cork the bottle tightly.

Must be freshly made when wanted for use.

This preparation is the same as in the Pharmacopœia of 1870.

Dose.—Fifteen to sixty cubic centimeters (½ to 2 fluidounces) several times a day.

Ferri Nitratis Liquor; U. S.

SOLUTION OF NITRATE OF IRON.

Ferrici Nitratis Solutio; Solution of Ferric Nitrate.

Mix one hundred and fifty grams (about 5 fluidounces) water of ammonia with four hundred grams (or 13½ fluidounces) cold water. Add to the mixture one hundred and eighty grams (6 ounces 150 grains) solution of tersulphate of iron, first diluted with one liter (34 fluidounces) of cold water. Stir well while mixing the liquids. Transfer the whole to a wet muslin strainer and let it drain. Then put the precipitate back in a jar, and mix it with one liter cold water, stir well, and again put it on the muslin strainer to drain. Repeat these washings until the water which drains away no longer gives a heavy cloud with solution of barium chloride. Then let the precipitate be completely drained, and put it in a porcelain evaporating dish with seventy grams (2 ounces 205

grains) nitric acid, stirring until solution is effected. Then add enough distilled water to make the whole weigh one thousand grams (35 ounces 120 grains).

Description.—See the Pharmacopœia, page 199. It is clear, amber-colored, or reddish; odorless; has an acid, styptic taste; reaction acid; specific gravity 1.050, corresponding to about 7° Baumé.

Strength.—Ten grams (154$\frac{3}{10}$ grains) of the solution, with ammonia added in excess, yield a precipitate which, after being washed, dried, and ignited, weighs 0.2 gram. It contains about six per cent. anhydrous ferric nitrate, corresponding to about two per cent. ferric oxide, or to about 1.4 per cent. metallic iron.

The preparation of the Pharmacopœia of 1870 was stated to have a specific gravity of 1.060 to 1.070; but the gravimetric test only required a yield of about two per cent. ferric oxide, so that the new preparation may be considered practically identical with the old.

Medicinal Uses.—Less astringent than the preparations of iron with sulphuric or hydrochloric acids. Used very rarely; useful in *diarrhœa*, etc., and in dilution as a local application in *leucorrhœa*.

Dose.—0.5 cubic centimeter (8 minims); as an injection one to two cubic centimeters in thirty cubic centimeters (15 to 30 minims in 1 fluidounce) of water.

Ferri Oxalas; U. S.

Oxalate of Iron.

Ferrosus Oxalas—Ferrous Oxalate.

Description and Tests.—See the Pharmacopœia, page 162. A heavy, lemon-yellow, crystalline powder; odorless, and almost tasteless. Nearly insoluble in water.

Dose.—0.2 to 0.3 gram (3 to 5 grains).

Ferri Oxidum Hydratum; U. S.

Hydrated Oxide of Iron.

Ferricus Hydras—Ferric Hydrate.

Dilute eight hundred grams (28 ounces 96 grains, or 28$\frac{1}{6}$ fluidounces) water of ammonia with two liters (68 fluidounces) cold water, in a four-gallon jar. Dilute one thousand grams (35$\frac{1}{3}$ ounces, measuring about 25$\frac{2}{3}$ fluidounces) solution of tersulphate of iron with ten liters (about 21 pints) of cold water. Pour the diluted solution of tersulphate of iron into the water of ammonia gradually and during constant stirring. Pour the whole upon a muslin strainer, previously well wetted, and let it drain. Then put the precipitate back into the jar and mix it well

with twelve liters (25⅓ pints) cold water. Drain it again as before, and afterward wash it once more in the same manner with another twelve liters of water. Finally mix the washed precipitate with enough cold water to make the whole product weigh two thousand grams (70 ounces 240 grains).

Hydrated oxide of iron is used as an antidote for arsenic, and when wanted for this purpose it must be freshly made, and dispensed as rapidly as possible. For this purpose the Pharmacopœia directs that the ingredients should be kept in a special place, already weighed out and ready to mix. One bottle should be there containing ten troyounces (311 grams) solution of tersulphate of iron, and another containing eight troyounces (249 grams) water of ammonia. When the hydrated oxide of iron is to be made, the water of ammonia is then at once poured into a two-gallon vessel with about one gallon water, and the solution of tersulphate of iron is poured in, all is stirred briskly, poured on a strainer, which after most of the liquid has run off, is gathered up by the hands, folded together, and pressed until the liquid is nearly all squeezed out. Enough water is then added to the precipitate to make the whole weigh twenty troyounces (622 grams).

Forms an insoluble compound with arsenic.

It is a reddish-brown wet mass, slowly soluble without residue, and without effervescence in hydrochloric acid.

The "Ferri Oxidum Hydratum cum Magnesia," described below, is a better antidote for arsenic.

Medicinal Uses.—Employed mainly as an antidote for *arsenical poisoning*, for which purpose it is administered in doses of five to fifteen cubic centimeters (a tea- to a table-spoonful) every ten or fifteen minutes. While the resulting arsenical iron salt may be insoluble in water it is not completely insoluble in the gastric juice, and should be removed from the stomach and bowels by emetics and laxatives.

Ferri Oxidum Hydratum cum Magnesia; U. S.

Hydrated Oxide of Iron with Magnesia.

Magnesio-Ferricus Hydras—Magnesio-Ferric Hydrate; Antidotum Arsenii—Antidote for Arsenic.

Mix sixty-five grams (2¼ ounces or 13½ fluidrachms) solution of tersulphate of iron with about sixty cubic centimeters (2 fluidounces) of water. Keep in a five-pint bottle.

Rub up ten grams (154 grains) magnesia with enough water to make a thin, smooth milk; pour this in a liter bottle (a quart bottle) and fill it up with water. Keep these two mixtures ready for use.

When wanted in a case of poisoning by arsenic, shake up the magnesia milk thoroughly, and then pour it gradually into the bottle containing the solution of tersulphate of iron, and shake the whole briskly until homogeneous.

The magnesia is purposely added in excess, and it, as well as the ferric hydrate formed, prevents the poisonous effects of the arsenic (whether arsenious or arsenic compounds) by forming insoluble combinations with it.

The preparation is a thick reddish-brown mixture. It contains ferric hydrate, magnesia, and magnesium sulphate.

Medicinal Uses.—This is the best antidote for *poisoning with arsenic*, and it is used in the same manner as the hydrated oxide of iron.

Ferri Oxidum Magneticum Præcipitatum.

Precipitated Magnetic Oxide of Iron.

Ferrico-Ferrosum Oxidum Præcipitatum—Precipitated Ferrico-Ferrous Oxide.

Dissolve five hundred grams (17 ounces 280 grains) sulphate of iron in one thousand five hundred cubic centimeters (51 fluidounces) water. Add twenty-five hundred grams (88 ounces) solution of tersulphate of iron. Dissolve three thousand grams (105 ounces 360 grains) carbonate of sodium in twelve liters (about 23 pints) water, and filter the solution. Pour the iron solution gradually and during constant stirring into the solution of carbonate of sodium; then boil the mixture about three hours, or until the effervescence ceases and the precipitate has been converted into a fine black powder. Let it settle. Decant the supernatant liquid. Wash the precipitate until the washings are tasteless or no longer contain sulphate. Then dry.

Description.—An impalpable, heavy, black powder, completely soluble in hydrochloric acid or in sulphuric acid.

Medicinal Uses.—When properly made this is a uniform and reliable preparation, rich in iron, easily tolerated by the stomach, and appropriate in cases of *anæmia*, or whenever chalybeates are indicated.

Dose.—0.3 to 0.6 gram (5 to 10 grains).

Ferri Phosphas; U. S.

Phosphate of Iron.

Ferricus Phosphas Solubilis—Soluble Ferric Phosphate.

Dissolve five hundred grams (17⅔ avoirdupois ounces) citrate of iron in one thousand eight hundred cubic centimeters (about 3¾ pints) distilled water, by the aid of water-bath heat. Add to this solution six

hundred grams (21 ounces 72 grains) sodium phosphate, and stir constantly until dissolved. Evaporate the solution at not above 60° C. (140° F.) to a thick syrup, paint this on plates of glass and dry so as to obtain scales.

It contains phosphate of iron and citrate of sodium, and the reaction is known to have taken place when the liquid turns green.

The preparation is a bright yellowish-green scale-salt, which is odorless, and has a slightly saline and acidulous taste. It is readily soluble in water. One hundred grams of the scales represent 13.50 grams metallic iron. Must be kept in well-corked bottles in a dark place, as it is liable to darken by exposure to light.

This is a new preparation, not heretofore described in any book. The fact that it has received the name "Phosphate of Iron," without any adjective to distinguish it from the familiar *Phosphate of Iron* of the Pharmacopœia of 1870, is liable to cause more or less confusion. The old phosphate of iron is the only phosphate of iron at this writing known in the trade, the new preparation described above being known only to a comparatively limited number of pharmacists, and although the old preparation is now dropped from the Pharmacopœia, it will be many years before it will cease to be a common article of trade under the same name. The new phosphate of iron ought to have been called "Soluble Phosphate of Iron," or, better still, "Soluble Ferric Phosphate." (See "Ferri Phosphas Precipitatus Cœruleus."

Medicinal Uses.—Same as of iron salts in general. Generally supposed to combine the action of iron with that of phosphrous.

Dose.—0.2 to 0.3 gram (3 to 5 grains).

FERRI PHOSPHATIS SYRUPUS.

Syrup of Phosphate of Iron.

Dissolve twenty-six grams (400 grains) soluble phosphate of iron in ninety cubic centimeters (3 fluidounces) hot distilled water ; then add enough syrup of orange flowers to make the whole product one liter (34 fluidounces).

Contains thirteen centigrams phosphate of iron in each five cubic centimeters (2 grains in each teaspoonful).

Dose.—About five cubic centimeters (one teaspoonful).

FERRI PHOSPHATIS VINUM.

Wine of Phosphate of Iron.

Dissolve twenty-six grams (400 grains) soluble phosphate of iron in ninety cubic centimeters (3 fluidounces) hot distilled water ; then add

three hundred cubic centimeters (10 fluidounces) elixir of orange, sixty cubic centimeters (2 fluidounces) syrup of orange flowers, and enough sherry wine to make the whole product one liter (34 fluidounces).

Contains thirteen centigrams phosphate of iron in each five cubic centimeters (2 grains in each teaspoonful).

Dose.—About five cubic centimeters (1 teaspoonful).

Ferri Phosphas Præcipitatus Albus.

White Precipitated Phosphate of Iron.

Ferricus Phosphas Præcipitatus—Precipitated Ferric Phosphate.

Dissolve two hundred grams (7 ounces 24 grains) sodium phosphate in two thousand cubic centimeters (68 fluidounces) distilled water. Add to this solution, during constant stirring, one hundred and fifty grams (5 ounces 127 grains) solution of tersulphate of iron previously diluted with one thousand cubic centimeters (34 fluidounces) water. Wash the precipitate first by decantation and afterward on a strainer until the washings pass tasteless. Then allow it to drain, and dry it in thin layers on delf plates by the aid of moderate heat.

A white or nearly white powder, insoluble in water or in alcohol, odorless and tasteless; soluble in solution of citrate of sodium or in solution of citrate of ammonium.

Ferri Phosphas Precipitatus Cœruleus.

Precipitated Blue Phosphate of Iron.

Ferri Phosphas, U. S. P. 1870; *Ferrico-Ferrosus Phosphas—Ferrico-Ferrous Phosphate.*

This is the blue phosphate of iron made by precipitating a solution of sulphate of iron with a solution of sodium phosphate. It was official in the old Pharmacopœia (1870) under the name of Phosphate of Iron—a title now given to a soluble scale salt of ferric phosphate with citrate of sodium (see page 488).

Precipitated blue phosphate of iron is a grayish-blue powder, odorless and tasteless, insoluble in water.

Dose.—0.2 to 0.3 gram (3 to 5 grains) in pill. Seldom used.

Ferri Pilulæ Compositæ; U. S. P.

Compound Iron Pills.

Triturate 9.75 grams (or 150 grains) powdered myrrh, 4.85 grams carbonate of sodium, and 4.85 grams (75 grains) sulphate of iron until

thoroughly mixed ; then add a sufficient quantity of simple syrup, beat the whole into a mass, and make one hundred pills.

Medicinal Uses.—Supposed to be peculiarly beneficial in *anæmia* with *amenorrhœa.*

Dose.—One to four pills two or three times a day.

Ferri Extractum Pomatum.

Ferrated Extract of Apples.

Ferrico-Ferrosus Malas Impurus—Impure Malate of Iron.

Pare five thousand grams (about 11 pounds) nearly ripe crab-apples, or any nearly ripe *sour* apples, crush them, and express the juice. Digest the juice with two hundred grams (7 ounces 24 grains) cut iron wire, or powdered iron, for ten days, or until all signs of effervescence cease. Replace the water lost by evaporation from time to time. Heat the mixture on a water-bath at about 70° C. (158° F.) during five or six hours. Then add two liters (68 fluidounces) water. Express. Mix the residue with more water, and press again. Mix the liquids, and let the mixture settle in a cool place. Filter. Evaporate the filtrate to the consistence of extract.

The extract is greenish-black, and has a styptic taste. It generally contains about seven to eight per cent. iron.

Dose.—0.25 to 0.5 gram (4 to 8 grains).

FERRI TINCTURA POMATA.

Ferrated Tincture of Apples.

Dissolve one hundred grams (3 ounces 230 grains) ferrated extract of apples in a mixture of one hundred and twenty grams (4 ounces 100 grains, or about 5 fluidounces) alcohol and seven hundred and eighty grams (27 ounces 225 grains, or about 26½ fluidounces) cinnamon water.

Dose.—One to two cubic centimeters (15 to 30 minims).

Ferri Pyrophosphas ; U. S.

Pyrophosphate of Iron.

The new pyrophosphate of iron is a ferric pyrophosphate with citrate of sodium. The former preparation of the same name was ferric pyrophosphate with citrate of ammonium. According to the present Pharmacopœia (1880) it is made as follows :

Dissolve four hundred and fifty grams (15 ounces 382 grains) citrate

of iron in one thousand eight hundred cubic centimeters (about 3¾ pints) distilled water by the aid of heat on a water-bath. To this solution add five hundred grams (17 ounces 280 grains) pyrophosphate of sodium, and stir constantly until dissolved. Continue the heat until the liquid is green. It now contains pyrophosphate of iron with citrate of sodium. Evaporate this to a thick syrup at a heat not above 60° C. (140° F.), paint it on glass plates, and dry to get scales.

The scales are apple-green, but darken on exposure to air. Perfectly soluble in water. Odorless ; taste slightly acidulous and saline. Reaction neutral. This preparation is less liable to change than the old one made with citrate of ammonium.

One hundred grams represent 11.50 grams metallic iron.

Medicinal Uses.—Same as of mild iron preparations in general. As it is readily soluble and nearly tasteless it is generally used in elixirs.

Dose.—0.2 to 0.3 gram (3 to 5 grains).

FERRI PYROPHOSPHATIS SYRUPUS.

Syrup of Pyrophosphate of Iron.

Dissolve twenty-six grams (400 grains) pyrophosphate of iron in one hundred and twenty cubic centimeters (4 fluidounces) boiling distilled water. Add enough syrup of orange flowers to make the whole measure one liter (34 fluidounces).

Contains thirteen centigrams pyrophosphate of iron in each five cubic centimeters (or two grains in each teaspoonful).

Dose.—Five cubic centimeters (teaspoonful).

Ferri Quininæ et Strychninæ Phosphatum Syrupus ; U. S.

Syrup of the Phosphates of Iron, Quinine, and Strychnine.

Dissolve 13.30 grams (205 grains) phosphate of iron in two hundred and fifty cubic centimeters (8½ fluidounces) distilled water. Add to it eighty grams (2 ounces 360 grains) phosphoric acid. Triturate 13.30 grams (205 grains) quinine and forty centigrams (6⅙ grains) strychnine with the acid iron phosphate solution until all is dissolved. Then add enough distilled water to make the whole liquid weigh four hundred grams (14 ounces 48 grains). Finally add six hundred grams (21 ounces) sugar, in coarse powder, and dissolve without heat.

The phosphate of iron to be used is the new pharmacopœial scale

preparation ; its solution in water when mixed with the phosphoric acid will throw down a whitish precipitate, which, however, soon redissolves, giving a clear yellowish solution. The phosphoric acid to be used is the new strong acid, containing fifty per cent. of ortho-phosphoric acid. The alkaloids, quinine, and strychnine will readily dissolve in the acid liquid.

The preparation is disagreeably bitter and acid, and has a bluish fluorescence from the acid phosphate of quinine.

It contains 6.5 centigrams each of phosphate of iron and the alkaloid quinine, and two milligrams of the alkaloid strychnine, to each five cubic centimeters of the syrup, corresponding to about one grain phosphate of iron, one grain quinine, and one thirty-second grain strychnine to each teaspoonful, which is the intended dose.

The quinine and strychnine contained in the syrup are combined with the phosphoric acid.

This syrup should be kept in small (not over 1-pound) bottles, in a cool, dark place.

Dose.—Two to five cubic centimeters (half to one teaspoonful).

Ferri Subcarbonas ; Phar. 1870.

Subcarbonate of Iron.

Made by precipitating a solution of eight parts of sulphate of iron with a solution of nine parts of carbonate of sodium.

Description.—It is a reddish-brown powder, odorless, tasteless, insoluble in water ; it dissolves wholly in dilute hydrochloric acid, with more or less effervescence. Consists chiefly of a basic ferric hydrate.

Dropped from the new Pharmacopœia.

Dose.—0.3 gram (5 grains) or more.

Ferri Subsulphas.

Subsulphate of Iron.

Ferricus Subsulphas—Basic Ferric Sulphate, Monsel's Powder, Persulphate of Iron.

Prepared by carefully evaporating solution of subsulphate of iron to dryness, stirring constantly with a porcelain spatula.

It is a lemon yellow, odorless, but extremely styptic powder. Should be instantly soluble in water. It is very hygroscopic.

Medicinal Uses.—Employed locally as a styptic, for which purpose it is an excellent preparation. Used for the same purposes as the corresponding solution.

Ferri Subsulphatis Liquor ; U. S.

SOLUTION OF SUBSULPHATE OF IRON.

Solutio Ferrici Subsulphatis—Solution of Basic Ferric Sulphate, Monsel's Solution, Solution of Persulphate of Iron ; Liqueur hémostatique de Monsel, F.

Put five hundred cubic centimeters (17 fluidounces) distilled water in a half-gallon porcelain evaporating dish. Add to it gradually, stirring briskly, a mixture of seventy grams (2 ounces 205 grains) sulphuric acid and one hundred and ten grams (3 ounces 385 grains) nitric acid. Heat the whole on a sand-bath to the boiling point. Add gradually (one-fourth at a time) seven hundred and seventy grams (27 ounces 71 grains) sulphate of iron previously crushed into coarse powder, waiting after each addition until the effervescence subsides before adding more. Now add a few drops nitric acid ; if red fumes appear, continue adding more nitric acid, a few drops at a time, until the red fumes cease to be formed. Then boil the liquid until all nitrous odor disappears, and the solution acquires a ruby-red color. Then add enough distilled water to make the final product weigh one thousand one hundred and forty grams (40 ounces 93 grains).

The process must be carried on under a hood to avoid the poisonous red fumes.

Description and Strength.—See the Pharmacopœia, pages 200, 201. Reddish-brown, syrupy ; almost odorless ; exceedingly styptic, but not caustic ; reaction acid. Specific gravity 1.555, corresponding to 52° Baumé.

When thirty cubic centimeters (1 fluidounce) of this solution is mixed gradually with fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) of sulphuric acid in a beaker-glass a whitish solid mass separates on standing. By this the Monsel's solution is readily distinguished from solution of tersulphate of iron, which does not form any solid mass when treated the same way.

Ten grams ($154\frac{3}{10}$ grains) of solution of subsulphate of iron, with an excess of water of ammonia, yields a precipitate which, after washing, drying, and ignition, weighs 1.94 gram (very nearly 30 grains). It contains 43.7 per cent. basic ferric sulphate, corresponding to 19.4 per cent. ferric oxide, or to about 13.5 per cent. metallic iron. It is practically of the same strength as the preparation of 1870.

Sold at present by the pound, put up in twelve-ounce acid bottles.

Medicinal Uses.—Powerfully astringent and much used as a hæmostatic and styptic, especially in *bleeding* from large surfaces, when

the blood oozes from all parts instead of coming from points which could be seized with the forceps and closed by torsion. It is less irritating than some of the other preparations used for the same purpose.

Useful in *epistaxis*, *hæmoptysis*, *hæmatemesis*, *hemorrhage from the rectum* or *uterus*, etc.

As a spray it has been used by inhalation in *hæmoptysis*. In the *hemorrhages following abortion* or *childbirth* it has been used as an injection into the uterus. It must be used with care for this purpose, as the injection of any of such powerful remedies may be followed by peritonitis ; but when it is an alternative between certain immediate death if the hemorrhage is not checked, and possible death from a possible peritonitis, we have no choice.

Dose.—0.3 to 1 cubic centimeter (5 to 15 drops) diluted. Externally either pure or diluted.

Ferri Sulphas ; U. S.

Sulphate of Iron.

Ferrosus Sulphas—Ferrous Sulphate.

Description and Tests.—See the Pharmacopœia, page 165.

Large, clear, bluish-green crystals of a sweetish, saline, styptic taste. Effloresce and turn white, and afterward brown by oxidation, when exposed to the air. When heated the crystals dissolve in their water of crystallization. Eighteen cubic centimeters water of 15° C. (59° F.) will dissolve ten grams of the sulphate of iron ; of boiling water thirty cubic centimeters (1 fluidounce) will dissolve one hundred grams (3 ounces 230 grains). It is insoluble in alcohol.

The salt contains seven molecules of water.

An aqueous solution containing ten per cent. of ferrous sulphate has the specific gravity 1.054 ; a twenty per cent. solution, 1.112 ; a thirty per cent. solution, 1.174 ; and a forty per cent. solution, 1.239—at 15° C. (59° F.).

Mainly used in the preparation of other iron salts.

Ferri Sulphas Exsiccatus ; U. S.

Dried Sulphate of Iron.

Ferrosus Sulphas Exsiccatus—Dried Ferrous Sulphate.

Prepared by exposing coarsely powdered ferrous sulphate in an unglazed earthen vessel to a moderate heat, stirring it from time to time, until it has become white all through. The heat is then increased to 149° C. (300° F.) and kept at that degree until the iron salt ceases to lose weight. Finally it is powdered.

It is pale grayish-white, soluble in water, with a small residue consisting of basic ferric sulphate ; one gram (15 grains) of the crystallized sulphate of iron will yield, and is medicinally equivalent to, about 0.61 gram (9 grains) of dried sulphate of iron ; or, in simpler terms, three grains of dried sulphate of iron are equivalent to five grains of the sulphate of iron.

Must be kept in well-corked bottles.

Medicinal Uses.—Tonic and exceedingly astringent. Internally it is mainly used to check *excessive secretions* depending on *debility,* as *night-sweats, leucorrhœa,* etc.

Combined with the extracts of aloes and nux vomica or belladonna it is a favorite remedy in *chronic constipation* due to a want of tone of the intestines.

Externally it is sometimes applied to *eczema* and other *skin diseases.*

Dose.—0.05 to 0.1 gram (1 to 2 grains).

Ferri Sulphas Impurus.

Impure Sulphate of Iron.

Ferrosus Sulphas Impurus—Impure Ferrous Sulphate, Copperas, Green Vitriol.

Resembles the sulphate of iron described under "Ferri Sulphas," but is more or less impure, containing usually zinc, copper, alumina, and manganese, besides mechanical impurities. The crystals are also generally more or less brownish-yellow on the surface, from basic ferric sulphate. The larger and clearer the crystals are, the purer the copperas.

Uses.—Employed extensively as a disinfectant, but as its disinfecting properties depend on chemical action by preventing the liberation of ammoniacal gases, this substance is not a true disinfectant, but rather merely a deodorizer.

Ferri Sulphas Præcipitatus; U. S.

Precipitated Sulphate of Iron.

Ferrosus Sulphas Præcipitatus—Precipitated Ferrous Sulphate, Granulated Sulphate of Iron.

Dissolve one thousand grams (35 ounces 120 grains) sulphate of iron in one thousand seven hundred cubic centimeters (about 3½ pints) distilled water, previously mixed with forty grams (1 ounce 180 grains) of sulphuric acid. Filter the solution. When cold pour it into an equal volume of alcohol, and set the mixture aside, in a well-covered vessel,

twenty-four hours. Then pour off the supernatant liquid from the crystalline powder, drain the latter in a funnel, wash it with alcohol until the washings no longer redden blue litmus paper, fold the crystalline powder in a piece of muslin, press gently, and then spread it out on filter paper to dry by sun-heat, and keep it in bottles closed with corks dipped in melted paraffine.

Description and Tests.—See the Pharmacopœia, page 166.

It is of a very pale bluish-green, almost white, color. In other properties it corresponds with the description of sulphate of iron.

Dose.—0.1 to 0.25 gram (2 to 4 grains).

Ferri Sulphidum.

Sulphide of Iron.

Ferrosum Sulphidum—Ferrous Sulphide, Black Sulphuret of Iron.

Dark-gray or blackish masses, porous, crystalline, brittle, odorless, tasteless, insoluble in water; soluble in dilute acids with the evolution of hydrogen sulphide, for which purpose it is employed.

Ferri Tersulphatis Liquor; U. S.

Solution of Tersulphate of Iron.

Solutio Ferrici Sulphatis—Solution of [normal] Ferric Sulphate.

Mix one thousand five hundred grams (52 ounces 400 grains) sulphuric acid with one thousand one hundred grams (38 ounces 350 grains) nitric acid and five thousand grams (about 10½ pints) distilled water in a porcelain evaporating dish capable of holding three gallons. Heat the mixture to the boiling point. Now add two thousand grams (70 ounces 240 grains) sulphate of iron, previously crushed in a mortar into coarse powder, and stir until effervescence ceases. Then add a second, third, and fourth portion of coarsely powdered sulphate of iron in the same manner, waiting each time until effervescence subsides before adding the next portion, so that altogether eight thousand grams (17 pounds 11 ounces 85 grains) have been added.

Continue heating until effervescence has entirely ceased. Then add a few drops of nitric acid; if red fumes should then be evolved, add carefully more nitric acid, a few drops at a time and during constant stirring, until red fumes cease to be formed. Now heat until the liquid becomes reddish-brown, and is free from nitrous odor. Finally, add enough distilled water to make the whole weigh twenty thousand grams (44 pounds 1 ounce 300 grains).

The heating must be done on a sand-bath, and in a hood, in order to get sufficient heat and to avoid the poisonous fumes.

Description.—See the Pharmacopœia, page 201. Reddish-brown; of but a faint odor; strongly styptic and acid taste; acid reaction; specific gravity 1.32, corresponding to about 35.3° Baumé—the same strength as that of the preparation of 1870. It mixes clear with water or with alcohol in all proportions.

It is distinguished from Monsel's solution by mixing thirty cubic centimeters (1 fluidounce) of it with fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) of sulphuric acid; if it should be Monsel's solution (solution of subsulphate of iron) a white solid mass will separate on standing; but this does not take place in solution of tersulphate of iron.

Strength.—Ten grams (154$\frac{1}{3}$ grains) of this solution precipitated with an excess of ammonia should yield a precipitate which, after washing, drying, and ignition weighs 1.15 gram (17$\frac{3}{4}$ grains).

It therefore contains 28.7 per cent of normal ferric sulphate, corresponding to eleven and a half per cent. ferric oxide, or about eight per cent. metallic iron, having the same strength in iron as the solution of acetate of iron. As compared with solution of chloride of iron, 1,613.5 grams (56 ounces 400 grains) solution of tersulphate of iron will yield the same quantity of ferric hydrate as one thousand grams (35 ounces 120 grains) of solution of chloride of iron.

Sold by the pound. A twelve-ounce acid bottle holds one pound conveniently.

Medicinal and other Uses.—Similar to those of Monsel's solution, but more irritating.

It is used mainly for preparing ferric hydrate and ferric salts generally.

Ferri Trochisci; U. S.

Iron Troches.

Triturate sixty-five centigrams (10 grains) vanilla with 97.50 grams (3 ounces 192 grains) sugar gradually added, and afterward incorporate 32.50 grams (1 ounce 64 grains) hydrated oxide of iron, freshly precipitated, and dried at a temperature not exceeding 80° C. (176° F.). Then add a sufficient quantity of tragacanth mucilage, and work the whole into a mass from which make one hundred troches.

The new formula differs from that of 1870 by containing hydrated oxide of iron instead of subcarbonate of iron.

Dose.—One tablet three or four times daily.

Ferri Valerianas; U. S.

VALERIANATE OF IRON.

Ferricus Valerianas—Ferric Valerianate.

Description and Tests.—See the Pharmacopœia, page 166. A dark brick-red amorphous powder, smelling faintly of valerianic acid, and having a mildly ferruginous taste. Insoluble in cold water, but soluble in alcohol.

It should be kept in bottles well closed with corks dipped in melted paraffine or wax.

Medicinal Uses.—In *chlorotic patients* of an *hysterical* nature the valerianic acid is supposed to exert a beneficial action, in addition to that of the iron. It is but little used.

Dose.—0.05 to 0.2 gram (1 to 3 grains) in pill three to four times daily.

Ferri Vinum.

IRON WINE.

Vinum Ferratum—Ferrated Wine, Simple Wine of Iron.

Macerate fifty grams (1 ounce 334 grains) cut iron wire for thirty days with one thousand cubic centimeters (34 fluidounces) sherry wine. The iron must be nearly, but not quite, immersed in the wine, the bottle in which the maceration takes place must be frequently shaken, and the stopper removed from time to time to admit air, and to let hydrogen gas escape. The bottle must be loosely corked.

The quantity of iron dissolved in the wine depends upon the quantity of free tartaric acid contained in the latter.

Dose.—A wine-glassful. It is a mild ferruginous preparation.

Ferri Vinum Amarum; U. S.

BITTER WINE OF IRON.

Mix eighty grams (2 ounces 360 grains) solution of citrate of iron and quinine, one hundred and twenty grams (4 ounces 100 grains, or 5 fluidounces) tincture of sweet orange peel, three hundred and sixty grams (12 ounces 305 grains, or about $9\frac{1}{4}$ fluidounces) simple syrup, and four hundred and forty grams (15 ounces 228 grains, or about $15\frac{1}{2}$ fluidounces) stronger white wine.

The preparation contains forty centigrams ($6\frac{1}{6}$ grains) solution of citrate of iron and quinine in each five cubic centimeters. This corresponds to about two grains citrate of iron and quinine to each teaspoonful, which is the intended dose.

Ferrum Albuminatum.

ALBUMINATE OF IRON.

Dissolve ten grams (154 grains) dried soluble albumen of egg in one hundred cubic centimeters (3⅓ fluidounces) distilled water ; mix the solution with a solution of 1.75 grams (27 grains) crystalline ferric chloride in thirty cubic centimeters (1 fluidounce) distilled water ; add twenty-four cubic centimeters (6 fluidrachms) alcohol. Evaporate the mixture at not above 40° C. (104° F.) to obtain the product in scales.

Golden-yellow scales, soluble in water, and containing about three and one-third per cent. metallic iron.

Dose.—0.05 to 0.3 gram (1 to 5 grains).

FERRI ALBUMINATI LIQUOR.

SOLUTION OF ALBUMINATE OF IRON.

Dissolve one gram (15 grains) albuminate of iron in one hundred cubic centimeters (3⅓ fluidounces) distilled water.

Ferrum Oxydatum Saccharatum Solubile; G.

SOLUBLE SACCHARATED OXIDE OF IRON.

Mix two hundred grams (7 ounces 24 grains) solution of ferric chloride of 1.48 specific gravity (see page 469) with two hundred grams (7 ounces 24 grains) simple syrup. Add gradually to this mixture four hundred grams (14 ounces 48 grains) solution of soda of 1.33 specific gravity, cover it well and set the whole aside for twenty-four hours. Then pour the clear liquid into about three liters (6⅓ pints) boiling distilled water, stir until mixed, and then set it aside to allow the precipitate to subside. The precipitation may be facilitated by heating the liquid on a water-bath. Decant the clear supernatant liquid, and wash the precipitate once, by affusion and decantation, with distilled water. Collect the precipitate on a muslin strainer, and wash it with distilled water so long as the washings pass through clear and continue to have a rather marked alkaline reaction. Then let it stand to drain off most of the water. Transfer the precipitate to a tared porcelain evaporating dish, mix it with nine hundred grams (31 ounces 327 grains) powdered sugar, and evaporate the whole on a water-bath to dryness, stirring constantly. Finally, incorporate enough additional powdered sugar to make the whole product weigh one thousand grams (35 ounces 120 grains). Reduce it to fine powder.

It is a reddish-brown powder, of a mild ferruginous taste, dissolves

perfectly in five times its own weight of water, forming a clear reddish-brown solution with a feebly alkaline reaction, and contains three per cent. iron.

Must be kept in tightly corked bottles.

Dose.—0.2 to 1 gram (3 to 15 grains) several times a day.

FERRI OXIDI SYRUPUS.

SYRUP OF OXIDE OF IRON.

Dissolve four hundred and thirty-three grams (15 ounces 120 grains) soluble saccharated oxide of iron, and two hundred grams (7 ounces 24 grains) sugar in a sufficient quantity of distilled water to obtain a syrup measuring one liter (34 fluidounces).

Each five cubic centimeters contains about 6.5 centigrams iron (one grain of iron to each teaspoonful).

Dose.—About one teaspoonful.

FERRI OXYDATI SOLUBILIS SYRUPUS; G.

Eisensyrup, G.

Contains one per cent. iron, or three hundred and thirty-three grams soluble saccharated oxide of iron in each kilogram, which is very nearly the same strength as the formula given above, the specific gravity of the German syrup being about 1.30.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

Ferrum Pulveratum.

POWDERED IRON.

Prepared by triturating pure wrought iron filings in steel mortars until reduced to a fine powder.

It is a heavy, gray, very fine powder. Should dissolve in dilute hydrochloric acid with scarcely any residue. The gas evolved from the solution should not darken a piece of white filter paper dipped in solution of subacetate of lead (sulphur).

Must not be brownish from oxidation.

Should be kept in tightly corked bottles in a dry place.

Uses.—Same as of reduced iron.

Ferrum Reductum; U. S.

REDUCED IRON.

Ferrum Redactum, Phar. 1870—*Quevenne's Iron, Iron by Hydrogen.*

Description and Tests.—See the Pharmacopœia, page 167.

A grayish-black, very fine, lustreless powder, which leaves a metallic

streak in the mortar when triturated. Soluble in diluted sulphuric acid with the evolution of nearly odorless hydrogen gas.

It always contains more or less magnetic oxide of iron, which renders the preparation darker in color. Must not be granular, or lumpy, or brownish.

Medicinal Uses.—Chalybeate. Should be given in powder and not in pilular form, and preferably at meal-time, so that it may be submitted to the action of the gastric juice.

Dose.—0.1 to 0.3 gram (2 to 5 grains).

Ficus; U. S.

FIG.

Feige, G.; *Figue*, F.; *Fikon*, Sw.

Origin.—*Ficus Carica*, Linné (*Urticaceæ*).

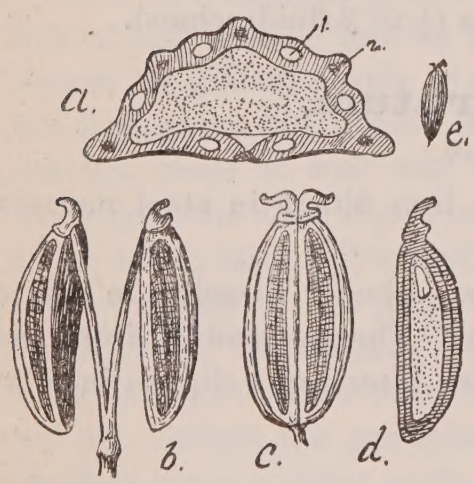
Description.—See the Pharmacopœia, page 167.

Constituents.—About sixty-two per cent. sugar, besides gum, fat, salts, etc.

Properties.—Demulcent, laxative. Roasted figs are used in poultices for gum-boils, etc.

Fœniculum; U. S.

FENNEL.



FIGS. 255–258.—Fennel. *a*, transverse section, enlarged, 1, oil-duct, 2, fibrovascular bundle; *b* and *c*, whole, enlarged; *d*, longitudinal section, enlarged; *e*, natural size.

Fœniculi Fructus—Fennel Fruit; Fenchelsamen, G.; *Fruits de fenouil, Semences de fenouil*, F.; *Hinojo*, Sp.; *Fenkål*, Sw.; *Fennel Seed.*

Origin.—*Fœniculum vulgare*, Gaertner (*Umbelliferæ*).

Habitat.—Cultivated, especially in Germany.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 167.

Varieties.—The fennel described in the Pharmacopœia is *German fennel.*

ROMAN FENNEL is obtained from *Fœniculum dulce*, D. C., and is larger, yellowish in color, more or less curved, slender, with sharp ribs. It has a sweeter and finer aroma than the German fennel, but contains less volatile oil.

Constituents.—The only important one is volatile oil, of which German fennel contains three per cent.

Medicinal Uses.—It is a stomachic and stimulant carminative. Used mainly to relieve *flatulency* and *colic.*

Dose.—One to two grams (15 to 30 grains), preferably in infusion.

FŒNICULI AQUA; U. S.

FENNEL WATER.

One gram (15 grains) volatile oil and two grams (30 grains) cotton, to make five hundred cubic centimeters (17 fluidounces), as described under Aquæ Aromaticæ.

Fennel water is an aromatic and slightly carminative vehicle for other medicines.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce) or more.

FŒNICULI OLEUM; U. S.

OIL OF FENNEL.

Fœniculi Ætheroleum — Volatile Oil of Fennel.

Description.—See the Pharmacopœia, page 236.

Dose.—0.1 to 0.2 cubic centimeter (3 to 6 drops).

FŒNICULI SPIRITUS.

SPIRIT OF FENNEL.

Mix thirty grams (or 1 ounce) volatile oil of fennel with two hundred and seventy grams (measuring 11¼ fluidounces) alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

FŒNICULI SYRUPUS.

FENNEL SYRUP.

Dissolve six hundred grams (21 ounces) sugar in four hundred cubic centimeters (13½ fluidounces) fennel water, without the aid of heat, and filter.

Frangula; U. S.

FRANGULA.

Frangulæ Cortex—Faulbaumrinde, G.; *Bourdaine, Bourgène*, F.; *Brakved*, Sw.; *Buckthorn Bark.*

Origin.—*Rhamnus Frangula*, Linné (*Rhamnaceæ*).

Habitat.—Europe.

Part used.—The bark. Not to be used until one year after it has been collected.

Description.—See the Pharmacopœia, page 168. Quills or troughs, about the diameter of the little finger, consisting of bark about one millimeter ($\frac{1}{25}$ inch) thick. Externally smoothish, grayish, or brownish, sometimes with lichenous growths; scars after leaves and buds are few and not prominent. The inner surface is quite smooth, finely striated lengthwise, and characteristically orange- or brownish-yellow. The bark is brittle. The odor is weak but peculiar; taste sweetish bitter. When chewed it colors the saliva yellow.

Large, rough, thick, flat pieces must be rejected.

The Pharmacopœia directs the use of only such bark as has been collected at least one year previously, because freshly collected frangula bark causes griping and emetic besides the purgative effects.

Constituents.—*Frangulin* (or rhamnoxanthin) is a lemon yellow, odorless, and tasteless glucoside. It is crystalline and sublimable, insoluble in water, and sparingly soluble in alcohol and ether. It has been suggested that it is identical with *cathartin*, the active constituent of senna.

Old frangula contains *emodin*—perhaps its most valuable constituent.

Medicinal Uses.—The fresh bark produces violent gastro-intestinal irritation, with vomiting, purging, etc. The old dry bark is a safe purgative, much employed in the *constipation of pregnancy*, etc.

It is best given in the form of the fluid extract.

FRANGULÆ DECOCTUM.

Decoction of Frangulæ.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces). See directions on page 399.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

FRANGULÆ EXTRACTUM.

Extract of Frangula.

From five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of the drug in No. 30 powder.

As a *menstruum* use cold water.

Moisten with two hundred and fifty grams (about $8\frac{1}{2}$ fluidounces). Pack tightly in a cylindrical percolator. Saturate with *menstruum*.

Macerate twenty-four hours. Percolate to exhaustion. Then evaporate to pilular consistence, and incorporate one-twentieth of its weight of glycerin with the still warm extract.

This extract and the fluid extract are the best preparations of frangula that have been made.

Brown.

Dose.—0.20 to 0.50 gram (3 to 8 grains).

FRANGULÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF FRANGULA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of one hundred grams (about $4\frac{1}{6}$ fluidounces) alcohol to every two hundred grams (about $6\frac{2}{3}$ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about $6\frac{1}{3}$ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

Frankenia.

FRANKENIA.

Frankeniæ Herba—*Yerba Reuma.*

Origin.—*Frankenia grandiflora* (*Frankeniaceæ*).

Habitat.—California.

Part used.—The whole plant.

FIGS. 259, 260.—Yerba Reuma. *a*, natural size; *b*, enlarged.

Description.—A branched stem, about fifteen centimeters (6 inches) long, with entire opposite leaves, tapering at the base, and small pink flowers. Odor none; taste saline, with an astringent after-taste.

Constituents.—It has not been analyzed.

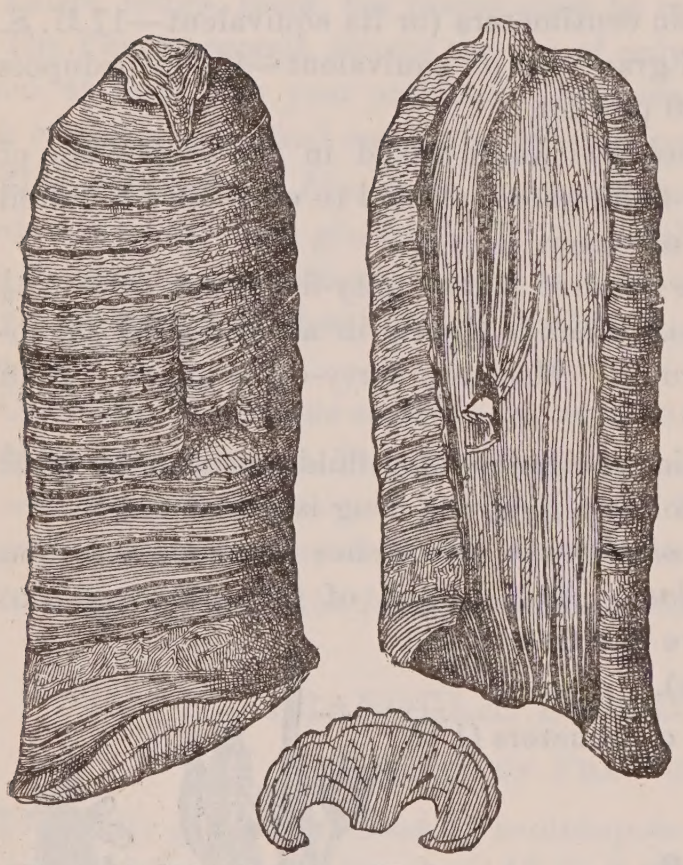
Uses.—It is recommended as a mild astringent, useful in diseases of the mucous passages, as in *catarrh*, *diarrhœa*, *leucorrhœa*, *gonorrhœa*, etc.

Dose.—0.5 to 1.5 gram (10 to 20 grains), best given in the form of FLUID EXTRACT, made with diluted alcohol as a menstruum.

Frasera.

FRASERA.

Fraserœ Radix—American Columbo.



FIGS. 261-263.—Frasera. Whole and transverse section, natural size.

Origin.—*Frasera Walteri*, Michaux (*Gentianaceæ*).

Habitat.—United States, in the Alleghanies and the West.

Part used.—The root.

Description.—Split lengthwise, about twenty-five millimeters (1 inch) thick, marked at the large end by transverse rings, wrinkled longitudinally below; brown externally, light yellowish-brown within; bark thick; odor reminding of gentian; taste sweetish, afterward bitter.

Constituents.—Contains, like gentian, the bitter glucoside, *gentiopicrin*, and a yellow crystallizable coloring matter (gentisic acid ?).

Medicinal Uses.—Bitter tonic, best given in the form of FLUID EXTRACT, made with diluted alcohol as a menstruum, of which the

Dose is two to five cubic centimeters (30 to 75 minims) several times a day.

Fucus Vesiculosus.

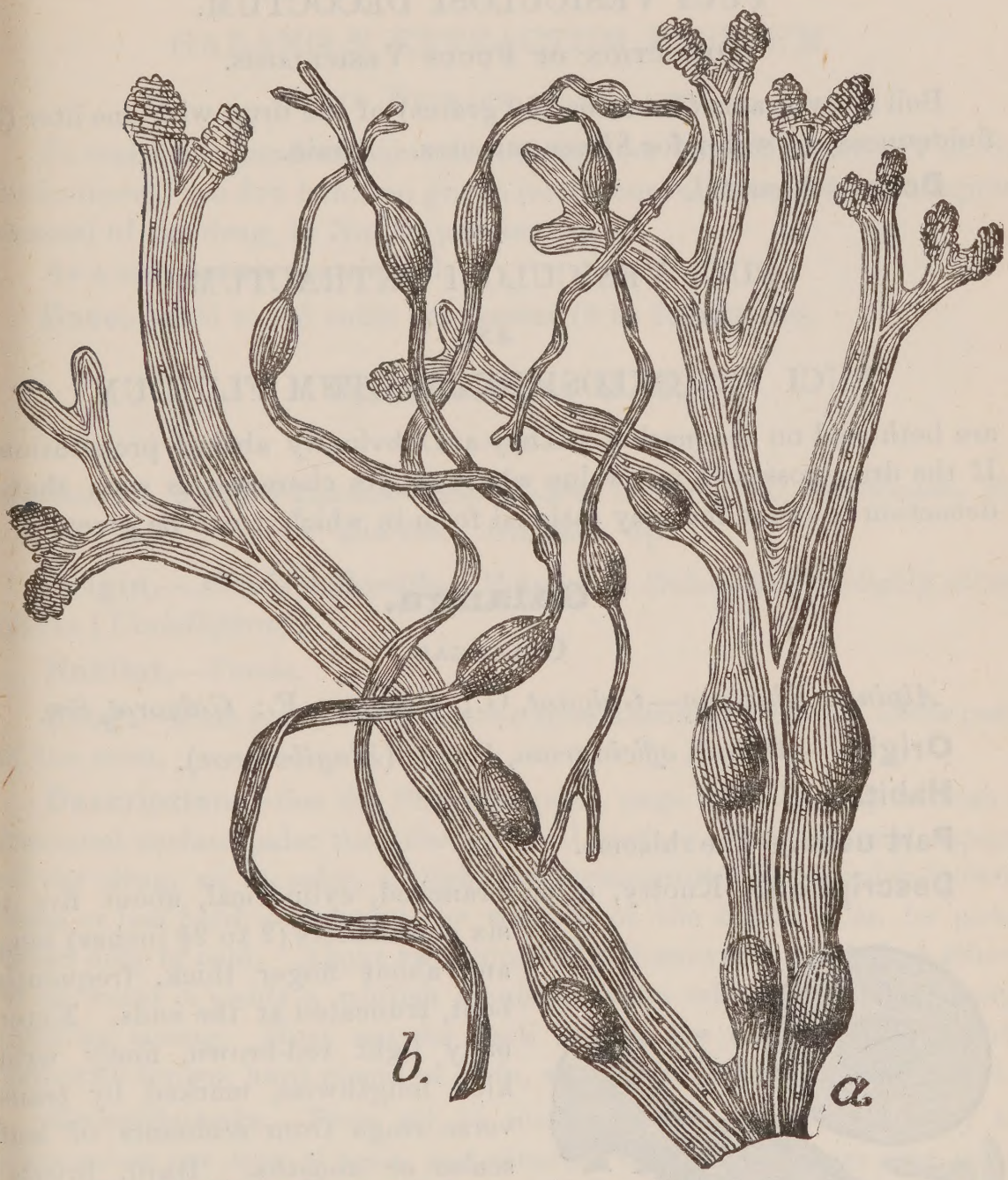
FUCUS VESICULOSUS.

Blasentang, G.; *Fucus vésiculeux*, F.; *Bladder-wrack, Sea-wrack, Sea-weed, Gulf-weed, Keep-ware, Blacktang.*

Origin.—*Fucus vesiculosus*, Linné (*Algæ*).

Habitat.—Atlantic Ocean.

Description.—The whole alga is used. A representative piece of it is shown in the figure. It is about one meter (40 inches) long, has a



FIGS. 264, 265.—*a*, Fucus vesiculosus; *b*, Fucus nodosus, both natural size.

dark brownish- or bluish-green color, a disagreeable fishy odor, and a mucilaginous, salty, bitter taste. *Fucus nodosus*, which is also figured, is often mixed with fucus vesiculosus.

Constituents.—Mucilage and a bitter substance (?). Yields about fifteen per cent. ash, containing chlorides, iodides, bromides, phosphates, etc.

Properties.—Alterative and tonic. Supposed to reduce obesity Best given in decoction.

FUCI VESICULOSI DECOCTUM.

DECOCTION OF FUCUS VESICULOSIS.

Boil sixty grams (2 ounces 100 grains) of the drug with one liter (3 fluidounces) of water for fifteen minutes. Strain.

Dose.—A cupful.

FUCI VESICULOSI EXTRACTUM

AND

FUCI VESICULOSI EXTRACTUM FLUIDUM

are both sold on the market. They are obviously absurd preparations If the drug possesses any value whatever, its character is such that decoction is about the only rational form in which it can be given.

Galanga.

GALANGAL.

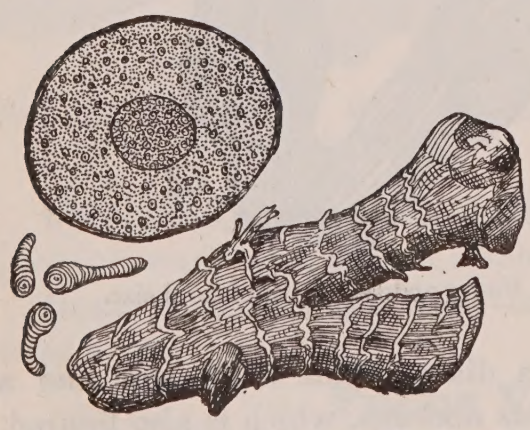
Alpiniæ Rhizoma—*Galgant*, G.; *Galanga*, F.; *Galgorot*, Sw.

Origin.—*Alpinia officinarum*, Hance (*Zingiberaceæ*).

Habitat.—China.

Part used.—The rhizome.

Description.—Knotty, often branched, cylindrical, about five t six centimeters (2 to 2⅖ inches) long and about finger thick, frequentl bent, truncated at the ends. Exter nally light red-brown, finely wrin kled lengthwise, marked by trans verse rings from remnants of leaf scales or sheaths. Hard, brittle fracture short, cinnamon brown. Th thickness of the bark is about equa to the diameter of the wood. Unde the microscope are seen in the trans verse section numerous brownish yellow resin-cells. Odor aromatic especially prominent when the drug is being ground; the taste is aro matic, pungent. Both odor and taste remind of ginger and anise.



FIGS. 266–268.—Galanga. Whole, natural size; transverse section enlarged, and starch grains.

Constituents.—Volatile oil and acrid resin.

Properties and Uses.—Similar to those of ginger ; stimulant and aromatic. Grated galanga is a popular snuff in *colds* and *catarrhs.*

GALANGÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF GALANGA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.25 to 1.5 cubic centimeter (5 to 20 minims).

Galbanum ; U. S.

GALBANUM.

Galbanum Gummi-Resina—Mutterharz, Galban, G.; *Galbanum,* F. and Sw.; *Galbano,* Sp.

Origin.—*Ferula galbaniflua,* Boissier et Buhse, and probably other plants (*Umbelliferæ*).

Habitat.—Persia.

Drug.—Gum resin, which exudes spontaneously from the lower part of the stem.

Description.—See the Pharmacopœia, page 168. Rarely whitish ; fractured surface paler than the external surface. The general aspect of the drug, as to color, is light yellowish-brown or greenish-brown. More or less hard, softens by the warmth of the hand. Can be powdered only in cold. About two-thirds of it dissolves in alcohol or ether. With water it yields a whitish emulsion when triturated. Odor very peculiar, strong. Must not be dark brown, nor contain transparent, yellowish-brown, hard pieces of resin, as sometimes seen in the market.

Constituents.—From six to nine per cent. *volatile oil,* sixty to sixty-seven per cent. of resin, and nineteen to twenty-two per cent. *gum.* The volatile oil is colorless, has 0.884 specific gravity, and is free from sulphur. The resin contains sulphur. By fusion with potassa galbanum yields *resorcin.*

Medicinal Uses.—Stimulant blennorrhetic, useful in *chronic bronchitis,* and in *chronic catarrhs* of mucous membranes generally. Externally irritant and suppurative.

Dose.—0.5 to 1 gram (8 to 15 grains) in pill. Usually combined with asafœtida or myrrh, or both.

GALBANI EMPLASTRUM; U. S.

GALBANUM PLASTER.

Melt together two hundred and forty grams (8 ounces) galbanum and thirty grams (1 ounce) Canada turpentine, and strain; then add ninety grams (3 ounces) Burgundy pitch, and afterward one thousand one hundred and forty grams (38 ounces) lead plaster, melting all on a water-bath and stirring them together thoroughly.

Almost identical with the old plaster (containing nearly four per cent. less lead plaster), which had the title Emplastrum Galbani Compositum.

Stimulant plaster in *rheumatism*, etc.

GALBANI PILULÆ COMPOSITÆ; U. S.

COMPOUND GALBANUM PILLS.

Make a pill-mass of 9.75 grams (150 grains) galbanum, 9.75 grams (150 grains) myrrh, 3.25 grams (50 grains) asafœtida, and sufficient simple syrup, and divide it into one hundred pills.

Dose.—Two to three pills.

Galla; U. S.

NUTGALL.

Gallæ Tinctoriæ—*Galläpfel*, G.; *Noix de galle*, *Galle de chêne*, F.; *Galläpplen*, Sw.; *Galls*, *Blue Galls*, *Aleppo Galls*.

Origin.—Excrescences on *Quercus lusitanica*, Webb, *var. infectoria*, D. C. (*Cupuliferæ*), caused by an insect.

Habitat.—The Levant.

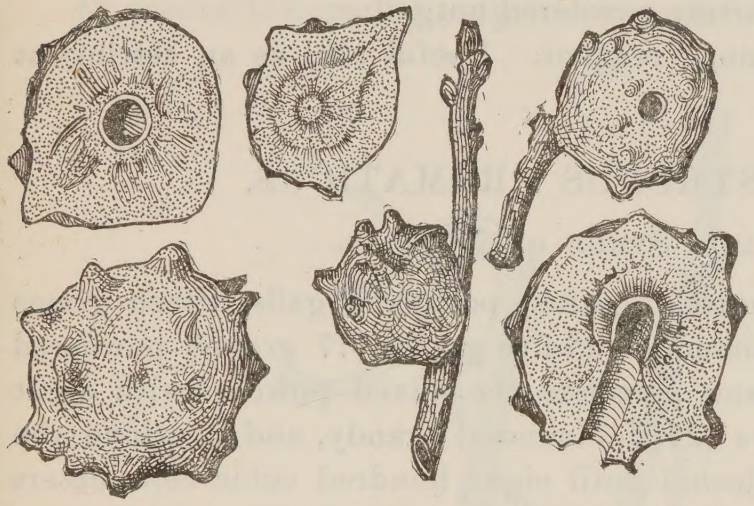
Description.—See the Pharmacopœia, page 168. They are heavy, hard, but brittle. Externally dark olive-green, or bluish-brownish-green, or blackish-gray; internally yellowish-gray, darker toward the centre. The wall of the central cavity is hard and brittle. The substance of the nutgall contains tannin, is nearly odorless, but strongly astringent.

Varieties.—Dark and heavy nutgalls are usually good. Light-colored, spongy galls of light weight are inferior.

Aleppo (or *Syrian*) *nutgalls* are the best kind.

California oakgalls (from Quercus lobata) are very large—about five centimeters (2 inches) in diameter, externally orange-brown, internally whitish and spongy, and very astringent.

Chinese and Japanese nutgalls (from Rhus semialata) are hollow, irregularly shaped tuberculate formations. They are quite rich in tannin ; but their tannin differs in kind from that of the official drug.



FIGS. 269-274.—Nutgalls, natural size, whole and sections, with and without holes.

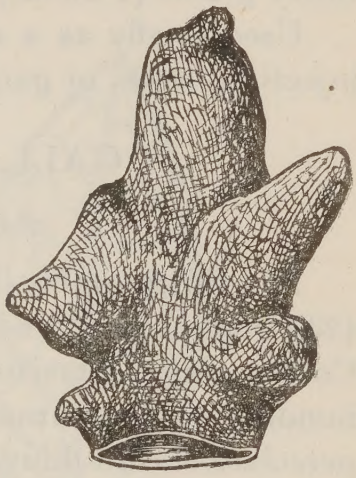


FIG. 275. — Chinese Gall, natural size.

Constituents.—From forty to seventy-five per cent. *tannin*, and from two to three per cent. *gallic acid*, besides unimportant constituents.

Medicinal Uses.—Powerfully astringent. A decoction or fluid extract in dilution is occasionally used internally in *diarrhœas*, etc., but more frequently externally as a wash to prevent *bed-sores ;* as a gargle and mouth-wash in *relaxed conditions* of the *pharynx*, *uvula*, or *gums*, and as an injection in *leucorrhœa*, etc.

Dose.—0.5 to 1 gram (8 to 15 grains).

GALLÆ EXTRACTUM FLUIDUM.

Fluid Extract of Nutgall.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 40 powder, mixed with an equal bulk of sand.

As a *first menstruum* use a mixture of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol, one hundred grams (about $3\frac{1}{3}$ fluidounces) water, and one hundred grams (about $3\frac{1}{2}$ avoirdupois ounces) glycerin.

As a *second menstruum* use diluted alcohol.

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

GALLÆ INFUSUM.

Infusion of Nutgall.

Make three hundred cubic centimeters (10 fluidounces) infusion from thirty grams (1 ounce) coarsely powdered nutgall.

Used chiefly as a chemical reagent. Useful also as an astringent injection, wash, or gargle.

GALLÆ SYRUPUS AROMATICUS.

Aromatic Syrup of Nutgall.

Mix thirty grams (1 ounce 25 grains) powdered galls, fifteen grams (230 grains) powdered cinnamon, and five grams (77 grains) powdered Cochin ginger; moisten and percolate the mixed powders with eight hundred cubic centimeters (27 fluidounces) brandy, and continue the percolation with diluted alcohol until eight hundred cubic centimeters (27 fluidounces) percolate has been received. Put the liquid in a porcelain evaporating dish, and place over it a coarse sieve containing eight hundred grams (28 ounces) cut sugar. Ignite the liquid and let it burn as long as the alcoholic strength of the liquid is sufficient to sustain the flame, and move the sugar immediately above the flame so that it may melt and drop through the sieve into the liquid. Add, if necessary, sufficient simple syrup to make the whole product one liter.

Dose.—For children, one to four cubic centimeters (15 to 60 minims).

GALLÆ TINCTURA; U. S.

Tincture of Nutgall.

Mix one hundred grams (3 ounces 230 grains) glycerin with nine hundred grams (31 ounces 327 grains, or about 33 fluidounces) diluted alcohol. Moisten two hundred grams (7 ounces 24 grains) nutgall, in No. 40 powder, with one hundred cubic centimeters ($3\frac{1}{3}$ fluidounces) of the mixture; pack it in a conical glass percolator, and percolate it with the remainder of the mixture and then with diluted alcohol until one thousand grams (35 ounces 120 grains, or about 34 fluidounces) tincture has been obtained.

Diluted with water it is used as an astringent wash or gargle.

GALLÆ UNGUENTUM; U. S.

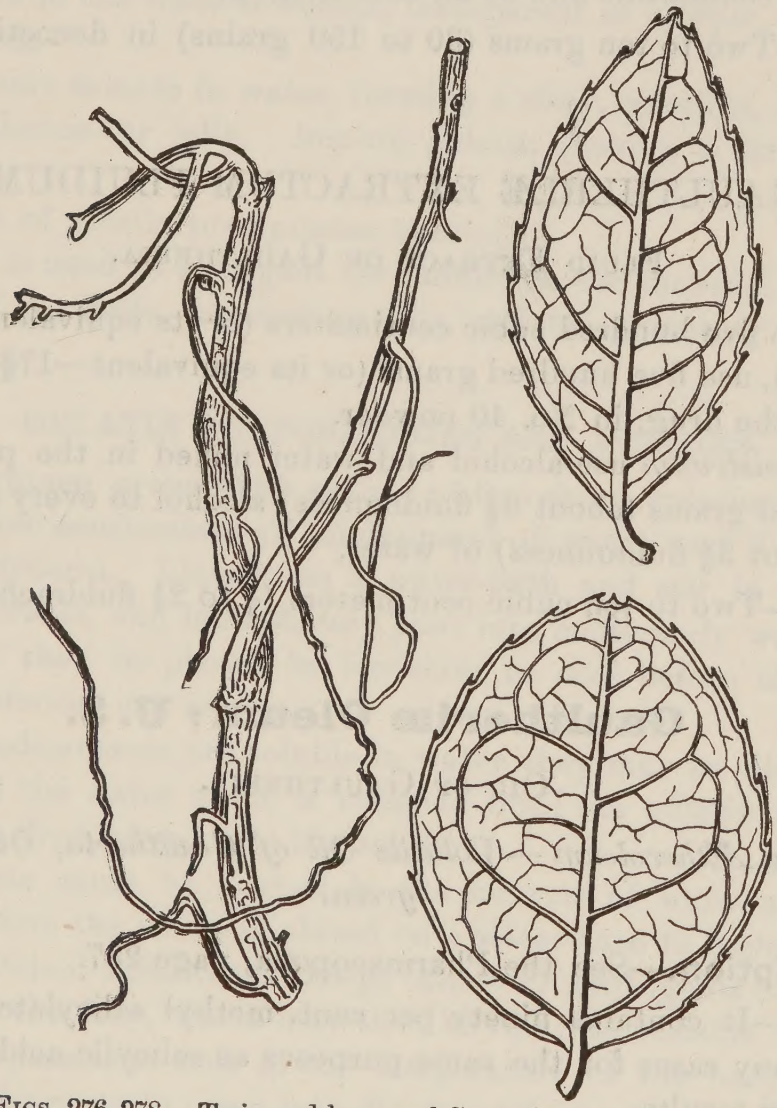
Nutgall Ointment.

Mix thirty grams (1 ounce) powdered nutgall and two hundred and seventy grams (9 ounces) benzoinated lard.

GALLÆ UNGUENTUM CUM OPIO.

NUTGALL OINTMENT WITH OPIUM.

Mix five grams (77 grains) powdered opium and ninety-five grams (3 ounces 153 grains) nutgall ointment.



FIGS. 276–278.—Twig and leaves of Gaultheria, natural size.

Gaultheria ; U. S.

GAULTHERIA.

Gaultheriæ Folia—*Canadischer Thee, Bergthee*, G.; *Feuilles de gaulthérie* (*de palommier*), F.; *Wintergreen, Teaberry, Checkerberry, Boxberry, Partridgeberry.*

Origin.—*Gaultheria procumbens*, Linné (*Ericaceæ*).

Habitat.—North America.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 169. Thick, smooth, shining green above, paler on the under surface. Generally mixed with twigs.

Constituents.—Volatile oil, tannin, arbutin, urson, ericolin, etc.

Medicinal Uses.—Stimulant and slightly astringent. Used as a tea in *bowel complaints* and as an emmenagogue.

Dose.—Two to ten grams (30 to 150 grains) in decoction or fluid extract.

GAULTHERIÆ EXTRACTUM FLUIDUM.

Fluid Extract of Gaultheria.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—Two to ten cubic centimeters (½ to 2½ fluidrachms).

Gaultheriæ Oleum; U. S.

Oil of Gaultheria.

Gaultheriæ Ætheroleum — Volatile Oil of Gaultheria, Oil of Wintergreen.

Description.—See the Pharmacopœia, page 237.

Uses.—It contains ninety per cent. methyl salicylate, and may be used in many cases for the same purposes as salicylic acid with equally satisfactory results.

Dose.—0.1 to 0.2 cubic centimeter (3 to 6 drops).

GAULTHERIÆ SPIRITUS; U. S.

Spirit of Gaultheria.

Mix thirty grams (1 ounce 25 grains) volatile oil of gaultheria and nine hundred and seventy grams (34 ounces 100 grains, or about 40 fluidounces) alcohol.

Used for flavoring.

Gelatinum.

GELATIN.

Prepared by boiling bone cartilage, skins, etc., in water until they dissolve. Upon cooling, the clear jelly thus obtained is cut into thin slices and dried on coarse netting.

It occurs in the trade in sheets, transparent or opaque, and in transparent shreds.

Completely soluble in water, forming a clear, colorless, odorless, and tasteless solution or jelly. Impure gelatin (having a strong odor) is *glue.*

Solution of gelatin precipitates tannin.

Gelatin is used as a reagent for tannin, as the material from which "capsules" are made, for coating pills, and for preparing gelatin suppositories.

GELATIN SUPPOSITORIES AND BOUGIES.

Soak eighteen grams (280 grains) of fine shred gelatin in a mixture of sixty cubic centimeters (2 fluidounces) of water, and 9 grams (140 grains) of glycerin. Liquefy on a water-bath and stir in the medicaments if insoluble, and immediately pour into moderately warm moulds, which must then be placed in ice-water to cool before the insoluble heavier substances can settle.

If the medicaments are soluble in water they may be dissolved in a small part of the water which is retained until the gelatin has become liquid and is then stirred into the solution.

The gelatin must be soaked in the mixture of water and glycerin until soft before the whole is placed on a water-bath to liquefy.

Any medicinal substances except tannin or astringents can be incorporated with the jelly, which may then be run into suitable moulds.

These preparations melt at the temperature of the body and allow the medicinal agents to come into direct contact with the diseased mucous surfaces of the parts into which they are introduced.

HEKTOGRAPHIC GELATIN

("Hektograph pads") may be made from thirty grams (1 ounce) gelatin, sixty grams (2 ounces) water, and ninety grams (3 ounces) glycerin.

The gelatin is to be soaked in the water until it softens. The glycerin is then added, and the whole heated by stirring on a water-bath until entirely dissolved.

Before filling the forms the gelatin solution must be allowed to rest long enough for all air-bubbles to break and disappear.

Gelsemium; U. S.

GELSEMIUM.

Gelsemii Radix—Gelbe Jasminwurzel, G.; *Racine de jasmin jaune*, F.; *Yellow Jasmine, Yellow Jessamine, Gelseminum.*

Origin.—*Gelsemium sempervirens*, Aiton (*Loganiaceæ*).

Habitat.—The southern portions of the United States.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 169. Thick, branched, cut rhizomes, from six to thirty millimeters ($\frac{1}{4}$ to $1\frac{1}{4}$ inch) in diameter, with much more slender rootlets.

Constituents.—The alkaloid *gelsemine*, which is amorphous, bitter, soluble in ether and alcohol, sparingly in water. Also volatile oil, resin, etc.

Medicinal Uses.—Powerfully depressant and sedative. Reduces the force and frequency of the heart-beats, and in large doses may produce death.

Used in *fevers* to reduce the pulse and temperature, though the latter action, except when given in poisonous doses, is denied by good authority.

Also useful in certain *nervous disorders*, especially of *neuralgic character*, *neuralgia of the fifth nerve*, and especially in *ovarian neuralgia.*

Also in *acute inflammations*, especially *pneumonia* and *pleuritis.*

Dose.—0.1 to 0.5 gram (2 to 8 grains), best given in the form of fluid extract.

Toxic Action.—In poisonous doses symptoms of cerebral disturbance and general paralysis occur. Respiration and the heart's action become excessively slow and labored, and death may occur from asphyxia.

ANTIDOTAL TREATMENT consists in the prompt evacuation of the stomach, diffusible stimulants, artificial warmth, electricity, and artificial respiration.

Digitalis and belladonna are physiological antidotes.

GELSEMII EXTRACTUM.

EXTRACT OF GELSEMIUM.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brown.

Dose.—0.02 to 0.10 gram ($\frac{1}{3}$ to $1\frac{1}{2}$ grain).

GELSEMII EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF GELSEMIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and fifty grams (about 6¼ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.10 to 0.5 cubic centimeter (2 to 8 minims).

GELSEMII TINCTURA; U. S.

TINCTURE OF GELSEMIUM.

Moisten sixty grams (2 ounces 50 grains) gelsemium, in No. 60 powder, with forty grams (1 ounce 180 grains, or about 1⅔ fluidounce) alcohol. Pack it tightly in a cylindrical percolator, and percolate with alcohol until four hundred grams (14 ounces 48 grains, or about 16½ fluidounces) has been obtained.

Dose.—0.5 to 4 cubic centimeters (10 to 60 minims).

Gentiana; U. S.

GENTIAN.

Gentianæ Radix—Enzianwurzel, Bitterwurzel, G.; *Racine de gentiane*, F.; *Genciana*, Sp.; *Baggsöta*, Sw.

Origin.—*Gentiana lutea*, Linné (*Gentianaceæ*).

Habitat.—Europe.

Part used.—The root.

Description.—See the Pharmacopœia, page 169. Large pieces are usually split. Internally the root is of a light orange-brown color. Swells considerably when soaked in water.

Must be sound and nearly dry.

Constituents.—Contains *gentiopicrin*, a bitter glucoside which crystallizes in colorless, neutral needles, and is soluble in water and in alcohol. The coloring matter in gentian is *gentianic acid* (gentisic acid). Soluble in alcohol. Contains no tannin.

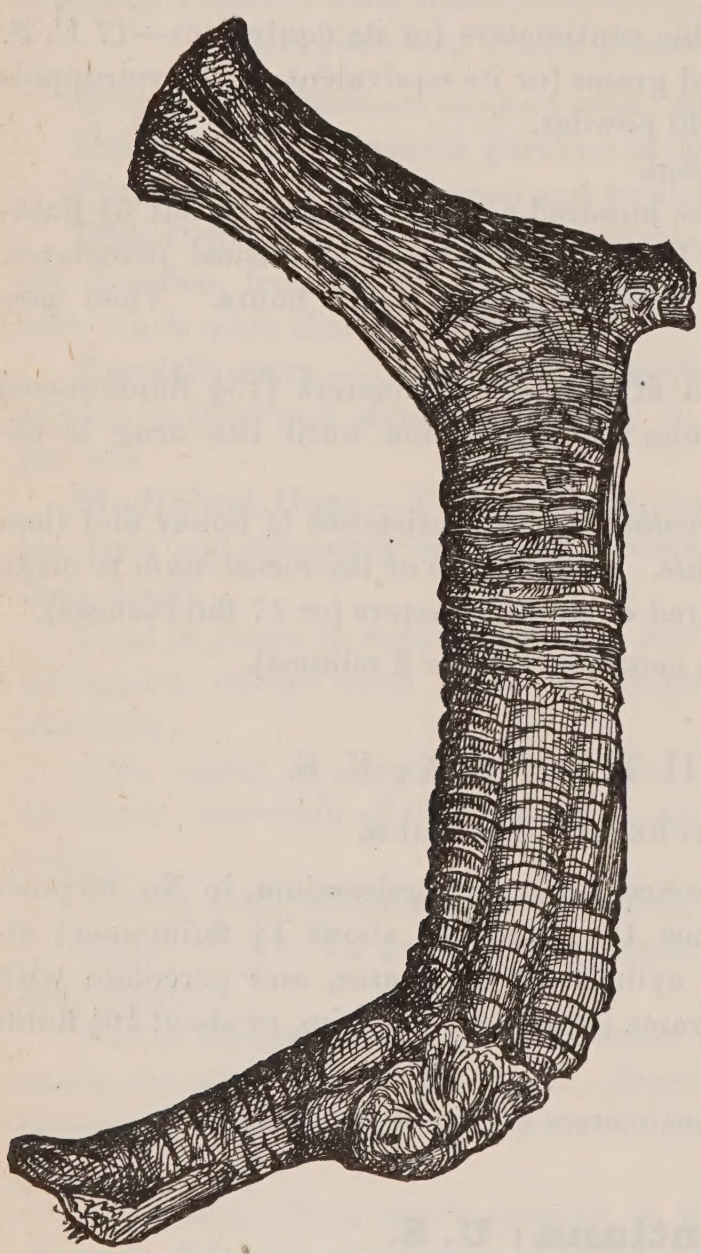


FIG. 279.—Gentian, natural size.

American gentian, from G. puberula, G. saponaria, and G. Andrewsii, is much smaller than the European gentian, and consists of a scarcely annulated head, only about twelve millimeters ($\frac{1}{2}$ inch) long and three millimeters ($\frac{1}{8}$ inch) thick, with a great number of light-colored rootlets about six centimeters ($2\frac{2}{5}$ inches) long.

Medicinal Uses.—Gentian is a simple, bitter tonic, very much employed as a stomachic and appetizer. It is a valuable remedy in certain forms of *dyspepsia* and *want of appetite* during convalescence.

The **dose** is from 0.5 to 2 grams (8 to 30 grains) in powder, but it is seldom given in this form.

GENTIANÆ EXTRACTUM; U. S.

EXTRACT OF GENTIAN.

Moisten five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of gentian, in No. 20 powder, with two hundred grams ($6\frac{3}{4}$ fluidounces) of water and macerate twenty-four hours. Then pack it in a conical percolator and percolate with water until the percolate passes through but slightly bitter. Boil the liquid down to three-fourths of its weight, and strain

it; then evaporate by water-bath heat to a pilular consistence. No glycerin is added to this extract.

Brown. Yield about twenty-five per cent.

Dose.—0.20 to 1 gram (3 to 15 grains).

GENTIANÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Gentian.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

GENTIANÆ EXTRACTUM FLUIDUM COMPOSITUM.

Compound Fluid Extract of Gentian.

Mix five hundred and seventy-three grams (20 ounces 100 grains) gentian, two hundred and eighty-seven grams (10 ounces 50 grains) bitter orange peel, and one hundred and forty-two grams (5 ounces) cardamom. Reduce the mixture to No. 40 powder. Use diluted alcohol as a menstruum. Make one thousand cubic centimeters (about 34 fluidounces) of finished fluid extract.

This fluid extract is about seven times the strength of the official compound tincture of gentian, and each cubic centimeter of it represents one gram of the mixed drugs.

Dose.—Two to five cubic centimeters (30 to 75 minims).

GENTIANÆ INFUSUM COMPOSITUM; Phar. 1870.

Compound Infusion of Gentian.

Mix ten grams (154 grains) gentian, 2.50 grams (38 grains) bitter orange peel, and 2.50 grams (38 grains) coriander, all in moderately

coarse (No. 40) powder. Moisten and percolate the mixed drugs with a mixture of forty cubic centimeters (1⅓ fluidounce) alcohol and two hundred and eighty cubic centimeters (9⅓ fluidounces) water, continuing the percolation afterward with water until three hundred and twenty cubic centimeters (10⅔ fluidounces) of percolate has been obtained.

Dose.—About thirty cubic centimeters (1 fluidounce) several times a day.

GENTIANÆ TINCTURA COMPOSITA; U. S.

COMPOUND TINCTURE OF GENTIAN.

Mix forty grams (1 ounce 180 grains) gentian, twenty grams (308 grains) bitter orange peel, and ten grams (154 grains) cardamom. Reduce the whole to No. 40 powder. Moisten and percolate with diluted alcohol to obtain five hundred grams (17 ounces 280 grains, or about 18 fluidounces) of tincture.

Dose.—Two to ten cubic centimeters (½ to 2½ fluidrachms).

GENTIANÆ VINUM.

WINE OF GENTIAN.

Moisten and percolate thirty grams (1 ounce) gentian, in No. 40 powder, with a mixture of one-fourth diluted alcohol and three-fourths Virginia seedling wine (by measure) until one thousand cubic centimeters (34 fluidounces) of percolate has been obtained.

Dose.—A wineglassful three times a day.

Gentiana Quinqueflora.

FIVE-FLOWERED GENTIAN.

Origin.—*Gentiana quinqueflora*, Lamarck (*Gentianaceæ*).

Habitat.—The United States.

Part used.—The whole plant.

Description.—*Stem* from thirty to sixty centimeters (1 to 2 feet) high, smooth, four-sided; *leaves* opposite, undivided, without leaf-stalks, nearly heart-shaped, clasping the stem at the base, pointed at the apex, about twenty-five millimeters (1 inch) long; *flowers* bright blue, but usually quite faded in the dried drug. It is inodorous; taste bitter.

Constituents.—Has not been analyzed.

Properties.—Bitter tonic, best given as FLUID EXTRACT made with diluted alcohol as a menstruum, of which the

Dose is 0.5 to 2.5 cubic centimeters (8 to 40 minims).

Geranium; U. S.

GERANIUM.

Geranii Rhizoma—*Cranesbill.*

Origin.—*Geranium maculatum*, Linné (*Geraniaceæ*).

Habitat.—North America.

Part used.—The root.

Description.—See the Pharmacopœia, page 169.

FIGS. 280, 281.—Geranium Root, whole and transverse section, large specimen, natural size.

Constituents.—From thirteen to seventeen per cent. tannin, some resin, etc.

Medicinal Uses.—Powerfully astringent. Used internally as an ingredient in diarrhœa mixtures, etc., or locally as a wash, injection, gargle, etc., in *relaxed conditions* of the mucous membranes.

Dose.—One to four grams (15 to 60 grains), best given in the form of fluid extract.

GERANII EXTRACTUM.

EXTRACT OF GERANIUM.

Evaporate any desired quantity of fluid extract made without glycerine to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.05 to 0.3 gram (1 to 5 grains) or more, repeated as required.

GERANII EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF GERANIUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, two hundred and twenty-five grams (about 7½ fluidounces) water, and fifty grams (about 1⅘ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6⅓ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to five cubic centimeters (15 to 75 minims).

Geum Rivale.

GEUM RIVALE.—WATER AVENS.

Gei Radix—Avens Root.

Origin.—*Geum rivale*, Linné (*Rosaceæ*).

Habitat.—North America.

Part used.—The root.

Description.—About five to eight centimeters (2 to 3 inches) long, and six millimeters (¼ inch) thick, knotty, scaly, wrinkled, externally brownish, whitish within, bark thin, pith large. Odor slightly aromatic; taste astringent, bitter. Radicles on the under side.

Constituents.—A little volatile oil, tannin, and bitter extractive. Possibly the bitterness is due to a definite principle as in *Geum urbanum*.

Medicinal Uses.—Astringent tonic. Useful in *diarrhœas* and in *relaxed conditions* of the mucous membranes generally.

Dose.—One to two grams (15 to 30 grains), best given as FLUID EXTRACT made with diluted alcohol as a menstruum.

Geum Urbanum.

GEUM URBANUM.—EUROPEAN AVENS.

Gei Urbani Radix—Radix Caryophyllata.

Origin.—*Geum urbanum*, Linné (*Rosaceæ*).

Habitat.—Europe.

Part used.—The root.

Description.—Finger-thick, about twelve to seventy-five millimeters ($\frac{1}{2}$ to 3 inches) long, usually truncated head, externally blackish-brown or reddish-brown, tortuous, wrinkled, scaly, brittle, flesh-colored within. Radicles from all sides, light colored, about three to eight centimeters (2 to 3 inches) long. Odor slightly aromatic, clove-like ; taste astringent, bitter.

Constituents.—Tannin from ten to forty per cent., from two to four per cent. resin, traces of volatile oil, and, according to Buchner, a bitter principle, called by him *gein*.

Medicinal Uses and Dose.—Like those of water avens.

Gillenia Trifoliata.

GILLENIA TRIFOLIATA.

Gilleniæ Radix—Indian Physic.

Origin.—*Gillenia trifoliata*, Moench (*Rosaceæ*).

Habitat.—The United States east of the Alleghany Mountains.

Parts used.—Rhizome and rootlets.

Description.—Like the corresponding parts of gillenia stipulacea, but smaller, less knotty, and with the rootlets more slender, smooth, less tortuous, and marked by less distinct transverse rings.

Constituents.—Same as in *Gillenia stipulacea*.

Medicinal Uses.—This drug resembles ipecacuanha in its action. In small doses it is diaphoretic and expectorant ; in larger doses a mild emetic. It is a useful tonic in some forms of *dyspepsia* in doses of 0.1 or 0.2 gram (2 to 3 grains).

Dose.—As an expectorant and diaphoretic, 0.1 to 0.3 gram (2 to 5 grains) ; as an emetic, one to two grams (15 to 30 grains), every fifteen or twenty minutes.

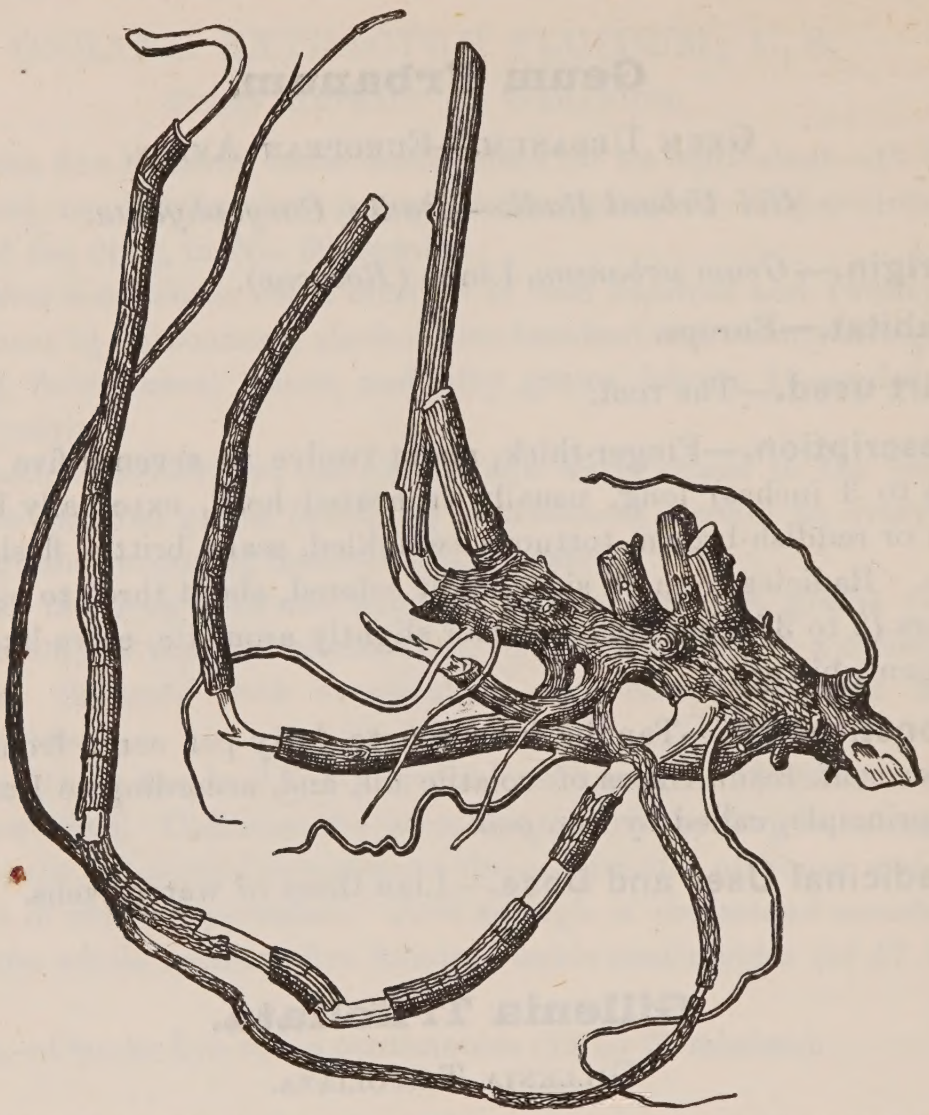


FIG. 282.—Indian Physic, natural size (rhizome and rootlets of Gillenia Trifoliata).

GILLENIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF GILLENIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Gillenia Stipulaceæ.

GILLENIA STIPULACEA.

American Ipecac.

Origin.—*Gillenia stipulacea*, Nutall (*Rosaceæ*).

Habitat.—The western and southern portions of the United States

Parts used.—Rhizome and rootlets.

Description.—Knotty, branched rhizomes, about ten to twenty-five millimeters ($\frac{2}{5}$ to 1 inch) thick, with thin bark. Rootlets numerous, somewhat tortuous, annulated and transversely fissured, with a thick, brittle bark in two layers, reddish, and marked with numerous resin dots. Inodorous. Bitter.

Constituents.—A bitter principle called *gillenin*, soluble in alcohol and in water, striking a blood-red color with nitric acid. Also resin, tannin, etc.

Medicinal Uses and **Dose** like those of Indian physic.

Glaucium.

GLAUCIUM.

Horn Poppy.

Glaucium luteum, Scopoli (Nat. Ord. *Papaveraceæ*). The whole plant, but especially the root, contains a saffron-yellow milky juice which is bitter and acrid, and contains three alkaloids, *sanguinarine* in the herb, and *glaucine*, and *glaucopicrine* in the root.

Medicinal Uses.—We are not aware that this drug has been used to any extent, but it seems to deserve trial on account of its very active constituents.

Glycerinum; U. S.

GLYCERIN.

Glycerina, Phar. 1870.—*Glycerin*, *Œlsüss*, G.; *Glycérine*, F.; *Glicerina*, Sp.; *Glycerin*, Sw.

Occurrence.—Glycerin is contained in all fixed oils and fats in combination with the so-called fatty acids. It never occurs naturally in a free state.

Production.—When fats or oils are decomposed in the formation of soaps or plasters glycerin is simultaneously produced. It is also made by decomposing fats with lime, or with concentrated sulphuric acid, or by steam at 180° to 190° C. (356° to 374° F.). Perfectly pure glycerin cannot be obtained directly. It must be distilled or crystallized.

Description.—See the Pharmacopœia, page 170. Does not evaporate on exposure to the air. Anhydrous (or absolute) glycerin has a specific gravity of 1.264 at 15° C. (59° F.). The official glycerin contains about ninety-five per cent., or over, by weight, of absolute glycerin, its minimum specific gravity being 1.25.

Glycerin mixes readily in all proportions with water, alcohol, or a

mixture of three parts alcohol and one part ether. It does not mix with chloroform, ether, oils, or benzol. With strong nitric acid it forms nitroglycerin (tri-nitrate of glyceryl), and it reduces permanganate of potassium, chlorinated lime, and chromic acid with great violence. Hence these substances should not be brought in contact with glycerin except in the presence of a sufficient quantity of water.

Solvent Powers.—Glycerin dissolves, with the aid of heat, many substances more effectively than water, as metallic salts and oxides, iodine, alkaloids, etc. It dissolves tannin, carbolic acid, gallic acid, salicylic acid, neutral nitrate of bismuth, bromine, iodine, etc.

Of carbolic acid the glycerin takes up three times its own weight; of chloride of iron twice its weight; of tannin one-sixth of its weight. Glycerin dissolves its own weight of borax, but the solution undergoes some chemical change, not yet understood, by which the solution becomes very acid.

Tests.—See the Pharmacopœia. The presence of *acrolein* renders the glycerin unfit for either internal or external medicinal use. *Acrolein* is frequently formed in the glycerin in the process of manufacture by the use of too great heat, and when not completely removed it renders the product acrid and irritating, being itself intensely acrid and poisonous.

It should not be supposed, however, that the smarting pain or irritation, frequently caused when glycerin is applied to chapped hands or to excoriated surfaces, necessarily proves the glycerin to be impure, for owing to the very hygroscopic nature of the glycerin, which causes it to absorb even as much as fifty per cent. of its weight of water from the air and from surfaces with which it comes in contact, it is itself very irritating when concentrated. Hence glycerin should not be used alone, but diluted or mixed with other liquids.

Medicinal Uses.—Used internally it is a food, but not a substitute for cod-liver oil.

It is used extensively in making various preparations, but is seldom given internally on its own account. Has been given in *piles* with alleged success.

Externally it is extensively employed in *fissured lips*, or *nipples*, or *chapped hands*, *itching*, etc.

Cotton tampons saturated with glycerin, or glycerin with tannic acid, are often employed in *leucorrhœa* and affections of the cervix uteri.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms), twice a day.

TABLE SHOWING THE QUANTITY OF WATER CONTAINED IN GLYCERIN OF VARIOUS SPECIFIC GRAVITIES.

Specific gravity according to Champion and Pellet.	Degrees Baumé.	Per cent. water by weight.	Specific gravity according to Champion and Pellet.	Degrees Baumé.	Per cent. water by weight.
1.2640	31.2	0.	1.2350	28.6	11.0
1.2625	31.0	0.5	1.2335	28.4	11.5
1.2612	30.9	1.0	1.2322	28.3	12.0
1.2600	30.8	1.5	1.2307	28.2	12.5
1.2585	30.7	2.0	1.2295	28.0	13.0
1.2575	30.6	2.5	1.2280	27.8	13.5
1.2560	30.4	3.0	1.2270	27.7	14.0
1.2545	30.3	3.5	1.2255	27.6	14.5
1.2532	30.2	4.0	1.2242	27.4	15.0
1.2520	30.1	4.5	1.2230	27.3	15.5
1.2505	30.0	5.0	1.2217	27.2	16.0
1.2490	29.9	5.5	1.2202	27.0	16.5
1.2480	29.8	6.0	1.2190	26.9	17.0
1.2465	29.7	6.5	1.2177	26.8	17.5
1.2455	29.6	7.0	1.2165	26.7	18.0
1.2440	29.5	7.5	1.2150	26.5	18.5
1.2427	29.3	8.0	1.2137	26.4	19.0
1.2412	29.2	8.5	1.2125	26.3	19.5
1.2400	29.0	9.0	1.2112	26.2	20.0
1.2390	28.9	9.5	1.2100	26.0	20.5
1.2375	28.8	10.0	1.2085	25.9	21.0
1.2362	28.7	10.5			

Glycerita.

GLYCERITES.

Glycerates, Glyceroles, Glycerics.

These preparations are simply solutions of medicinal substances in glycerin. They keep well, as a rule, and are generally miscible with water.

Glycyrrhiza; U. S.

GLYCYRRHIZA.

Glycyrrhizæ Radix—Radix Liquiritiæ—Süssholz, G.; *Réglisse, Bois de réglisse, Boisdoux, Racine douce*, F.; *Regaliz, Orozuz*, Sp.; *Lakritzrot*, Sw.; *Liquorice Root.*

Origin.—*Glycyrrhiza glabra*, Linné (*Leguminosæ*).

Habitat.—Southern Europe; cultivated.

Description.—See the Pharmacopœia, page 171.

Varieties.—Spanish, Italian, German, and Turkish liquorice root are all obtained from glycyrrhiza glabra and correspond to the description given above. They generally, or nearly always, have the external

grayish-brown bark remaining. Sometimes they are sold cut. The Spanish liquorice root is somewhat thicker and has a purer yellow color than the other kinds.

These varieties are distinguished from the Russian by the fact that they have a darker color, no fissures in the interior, are heavier (sink in water), and have a sweeter taste than the Russian variety.

Russian liquorice root is usually decorticated, light colored, not heavy (floats on water), less sweet than Spanish or German liquorice root, thick (bark, when present, thin), and has many fissures in the woody tissue (along the medullary rays). It is obtained from *Glycyrrhiza glabra*, var. *Glandulifera* (Flückiger and Hanbury), or from *G. echinata*. Russian liquorice root is used chiefly for making powdered liquorice root, to which purpose it is well adapted, the gray-brown bark (which when present gives the powder a dark, dirty color) being removed in this variety of the drug. Spanish or German liquorice root, however, is superior in quality, and when decorticated, affords a far superior powder, of a rich yellow color.

For preparations such as fluid extract, pure extract, etc., Russian liquorice root should not be used, and is in fact excluded by the Pharmacopœial description of the drug.

Impurities.—Pieces of the underground stem (stolon) are often present. They do not possess the properties of the root and must therefore be rejected. They are to be recognized by their having a pith, and by the scars from buds.

Constituents.—The most important are *glycyrrhizin*, resin, sugar, and asparagin ; besides, there are starch, gum, pectin, etc.

Glycyrrhizin is an amorphous yellowish-white, bitter-sweet glucocide, which in the root probably exists combined with ammonia. It is freely soluble in boiling water ; less readily in cold water. Readily soluble in alcohol. With dilute acids it splits up into sugar and an amorphous brownish-yellow bitter substance called *glycyrrhetin*. The resinous matter in glycyrrhiza is also bitter and causes the acrid after-taste in the fauces.

Medicinal Uses.—Demulcent and slightly stimulant to the bronchial mucous membranes, relieving *congestion* and promoting expectoration. The extract is a popular remedy in *coughs* and *colds*. If allowed to dissolve slowly in the mouth, it acts like acacia in relieving *irritation of the fauces* and larynx, and allays *cough* depending on an irritation or tickling in these places. It possesses the valuable property of masking the disagreeable taste of quite a number of medicines. The powder is much used as a conspergative for pills.

Dose.—Ad libitum, usually in the form of solid extract.

GLYCYRRHIZÆ PULVIS COMPOSITUS; U. S.

COMPOUND GLYCYRRHIZA POWDER.

Compound Powder of Liquorice—Pulvis Pectoralis Kurellæ; Brustpulver, G.

Mix eighteen grams (278 grains) senna, sixteen grams (247 grains) glycyrrhiza, eight grams (124 grains) fennel, eight grams (124 grains) washed sulphur, and fifty grams (1 ounce 334 grains) sugar, all in fine powder.

Used as a mild laxative.

Dose.—About one teaspoonful at bedtime.

GLYCYRRHIZÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF GLYCYRRHIZA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of sixty grams (about 2½ fluidounces) alcohol, sixty grams (about 2 fluidounces) water, and ten grams (about 154 grains) water of ammonia.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and seventy-five cubic centimeters (12⅕ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Add fifteen grams (230 grains) water of ammonia to the *second percolate*.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Fluid extract of glycyrrhiza is largely used as a sweetening agent in solutions and mixtures containing bitter or nauseous medicines. It is frequently added to quinine mixtures. In such cases it is to be remembered that the addition of any acid defeats the object in view, for

free acid precipitates the glycyrrhizin, and instead of masking the bitter taste of the quinine we obtain a mixture with an unsightly precipitate in it and more bitter than before.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

GLYCYRRHIZÆ EXTRACTUM PURUM; U. S.

Pure Extract of Glycyrrhiza.

Mix seventy-five grams (2 ounces 280 grains avoirdupois) water of ammonia with fifteen hundred grams (51 fluidounces) of water. Moisten five hundred grams (17⅔ avoirdupois ounces) of glycyrrhiza (liquorice root) in No. 20 powder with five hundred grams (about 17 fluidounces) of the mixture. Macerate twenty-four hours. Then pack it moderately in a cylindrical glass percolator. Percolate, first with the remainder of the ammoniacal mixture, and afterward with water until the glycyrrhiza is exhausted. Finally evaporate the percolate by water-bath, heat to the consistence of soft pill mass.

This extract is brownish-black, very pure and sweet, and forms a clear rich brown solution with water.

Dose.—Two to five grams (30 to 75 grains).

GLYCYRRHIZÆ MISTURA COMPOSITA; U. S.

Compound Mixture of Glycyrrhiza.

Brown Mixture.

Triturate thirty grams (1 ounce 25 grains) pure extract of glycyrrhiza, thirty grams sugar, and thirty grams acacia, in powder, with seven hundred cubic centimeters (23½ fluidounces) water, gradually added, until well mixed; then add one hundred and twenty grams (4 ounces 100 grains, or about 4 fluidounces) camphorated tincture of opium, sixty grams (2 ounces 50 grains, or about 2 fluidounces) wine of antimony, and thirty grams (1 ounce 25 grains, or about 1¼ fluidounce) spirit of nitrous ether.

Used in cough mixtures.

Dose.—Ten to fifteen cubic centimeters (2 to 4 fluidrachms).

GLYCYRRHIZÆ SYRUPUS.

Syrup of Glycyrrhiza.

Dissolve fifty grams (1 ounce 334 grains) pure extract of glycyrrhiza in nine hundred and fifty grams (33 ounces, or 25 fluidounces) simple syrup.

Used as a vehicle or for flavoring.

Glycyrrhizæ Extractum; U. S.

Extract of Glycyrrhiza.

Glycyrrhizæ Extractum Crudum—Succus Liquiritiæ—Lakritz, G. and Sw.; *Extrait de réglisse*, F.; *Extracto de regaliz*, Sp.—*Black Liquorice, Extract of Liquorice.*

See the Pharmacopœia, page 121. An impure extract from the roots of *Glycyrrhiza glabra* and *G. echinata.* Usually in sticks, the appearance of which is familiar. Also occurring in solid masses.

Should be solid, black, shining, hard, very sweet, and yield not less than three-fifths of its weight to cold water. The undissolved portion is flour, which had been added in preparing the liquorice.

Calabrian liquorice is the best of the stick liquorice. It is stamped *Baracco, Martucci*, or *Corigliano.* Of the Italian stick liquorice *Solazzi* is the best.

The important constituent of liquorice is *Glycyrrhizin* (see Glycyrrhiza).

Used mainly as a lenitive and demulcent in *irritated conditions* of the mouth and fauces.

GLYCYRRHIZÆ ET OPII TROCHISCI; U. S.

Troches of Glycyrrhiza and Opium.

This preparation will be found under the head of Opium, with the title "Opii et Glycyrrhizæ Trochisci," as it is not a preparation of glycyrrhiza as much as a preparation of opium. This arrangement is unavoidable in order to carry out our plan of arranging all preparations under the heads of their most important constituents or ingredients, respectively. We have treated the several preparations of opium with ipecacuanha in the same manner.

GLYCYRRHIZÆ ELIXIR PECTORALE.

Pectoral Drops.

Dissolve sixty grams (2 ounces) pure extract of glycyrrhiza in one hundred and eighty cubic centimeters (6 fluidounces) fennel water, and 1.50 gram (24 minims) oil of anise in four hundred and eighty cubic centimeters (16 fluidounces) alcohol. Mix the solutions. Then add ten cubic centimeters (2½ fluidrachms) water of ammonia.

Used in colds, etc.

Dose.—Two to five cubic centimeters (30 to 75 minims).

GLYCYRRHIZÆ VINUM THEBAICUM; SW.

WINE OF LIQUORICE WITH OPIUM.

Rosén's Bröstdroppar, SW.

Macerate during five days twenty grams (300 grains) powdered opium, twenty grams (300 grains) Spanish saffron, and twenty grams (300 grains) powdered extract of glycyrrhiza with one liter (34 fluidounces) Malaga wine. Express and filter, adding sufficient Malaga wine through the filter to make the whole product weigh one thousand grams (35 ounces 120 grains, measuring about 34 fluidounces).

Used in *colds, coughs*, etc.

Dose.—One to three cubic centimeters (15 to 45 minims).

Glycyrrhizinum Ammoniatum; U. S.

AMMONIATED GLYCYRRHIZIN.

Ammoniacal Glycyrrhizin.

Moisten five hundred grams (17⅔ avoirdupois ounces) of glycyrrhiza, in No. 20 powder, with a mixture of twenty-five grams (about 6 fluidrachms) water of ammonia, and four hundred and seventy-five cubic centimeters (about 1 pint) water, and macerate for twenty-four hours. Then pack it moderately in a cylindrical percolator, and pour more menstruum upon it, consisting of water of ammonia and water mixed in the same proportions as before, percolating until two thousand five hundred grams (88 fluidounces) percolate has been obtained. To this percolate add diluted sulphuric acid, slowly and during constant stirring, as long as any precipitate is produced by a fresh addition. Collect the precipitate on a strainer and wash it with cold water. Then redissolve it in water with water of ammonia added, filter the solution if necessary, and again precipitate with sulphuric acid as before. Collect this precipitate, wash it with water on a strainer, then dissolve it in a sufficient quantity of a mixture of equal parts by measure of water of ammonia and water. Paint this solution on plates of glass, and dry it so as to obtain the product in scales.

Ammoniated glycyrrhizin is in dark-brown or brownish-red scales of a very sweet taste. Inodorous; completely and readily soluble in water and in alcohol. When the aqueous solution of it is mixed with solution of soda or potassa, vapors of ammonia are liberated. The addition of acid precipitates the glycyrrhizin from its aqueous solution.

Must be in scales (as this best insures purity and proper qualities), perfectly free from any bitterness, and readily and completely soluble.

Its intense sweetness is such as to effectually mask the taste of bitter, nauseous medicines, and this is its only use.

Gnaphalium.

GNAPHALIUM.

Life Everlasting.

Origin.—*Gnaphalium polycephalum*, Linné (*Compositæ*).

Habitat.—The United States.

Part used.—The flowering herb.

Description.—The florets are yellowish. Fragrant; taste aromatic, bitter.

Constituents.—Volatile oil and bitter extractive.

Medicinal Uses.—Slightly aromatic, tonic and astringent. Of little importance.

Dose.—One to four grams (15 to 60 grains), best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum.

Gossypium; U. S.

COTTON.

Baumwolle, G.; *Coton*, F.; *Bomull*, Sw.

The hairs (lanugo) of the seeds. They are simple cells, and consist of nearly pure cellulose. Cotton fibre, though round when still fresh in the pod, becomes dry and collapsed when gathered, and then presents a spiral and band-like appearance under the microscope. (See figure.) It is one of the most frequent accidental foreign substances in our mounted specimens for the microscope, as the air in our rooms almost always contains small floating particles of this substance, which settles as dust on our slides during mounting. We have known bits of this fibre to have been mistaken for urinary casts, which will, of course, not happen to one familiar with its appearance.

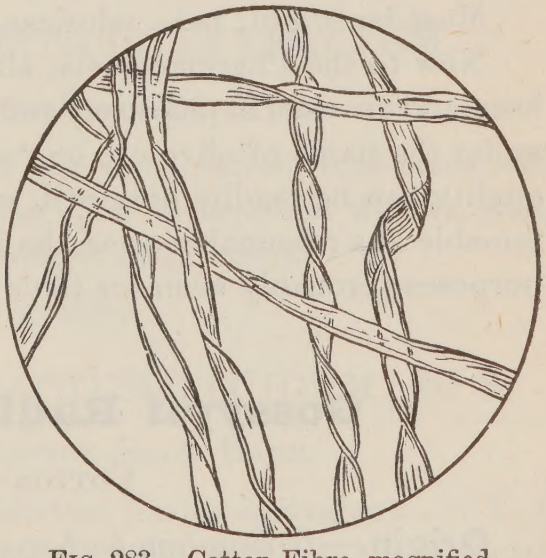


FIG. 283.—Cotton Fibre, magnified.

Raw cotton is more or less impure from adhering fixed oil, etc. To make it pure and clean it is washed in weak soda lye, then in pure water, and dried. After this purification it absorbs water rapidly, and sinks when thrown upon its surface. It is therefore called "Absorbent Cotton."

Pharmaceutical Uses.—Cotton is often used in funnels to filter oils, etc., and for preparing officinal waters.

Medicinal Uses.—As a dressing in *burns*, *scalds*, *excoriations*, etc.

Also as an absorbent dressing to surfaces or *abscesses* discharging much pus.

It is a protective dressing for *surgical wounds*, and prevents septic matter from gaining access to the raw surfaces. For this purpose it is often carbolized.

HÆMOSTATIC COTTON

is made by dipping absorbent cotton in solution of chloride of iron and drying and picking it. Sometimes alum is also added. One formula prescribes twenty grams solution chloride iron (1.48 specific gravity), ten grams potassa alum, and one hundred and twenty grams water, with which the cotton is saturated.

Gossypii Seminis Oleum; U. S.

Cotton-Seed Oil.

Origin.—*Gossypium herbaceum*, etc.

Description.—See the Pharmacopœia, page 237. It is a fixed oil expressed from the cotton seed, and refined.

Must be bright, pale, odorless, and free from acrid after-taste.

New to the Pharmacopœia, although very large quantities of it have been and are used in pharmacy and medicine, as well as for table purposes, under the name of olive oil, or "salad oil." As cotton-seed oil of good quality can be readily obtained, while good olive oil is not always obtainable at a reasonable price, the former should be preferred, as for most purposes (probably even for table use) it is quite equal to olive oil.

Gossypii Radicis Cortex; U. S.

Cotton-Root Bark.

Origin.—*Gossypium herbaceum*, Linné, and other species of *Gossypium* (*Malvaceæ*).

Habitat.—The United States, south of Pennsylvania.

Part used.—The bark of the root.

Description.—See the Pharmacopœia, page 172.

Constituents.—Resin, tannin, and red coloring matter.

Medicinal Uses.—It acts on the uterus similarly to ergot. It is employed in cases of *suppression* or *scanty secretion of the menstrual flow*, or in *dysmenorrhœa*, and in large dose may produce abortion.

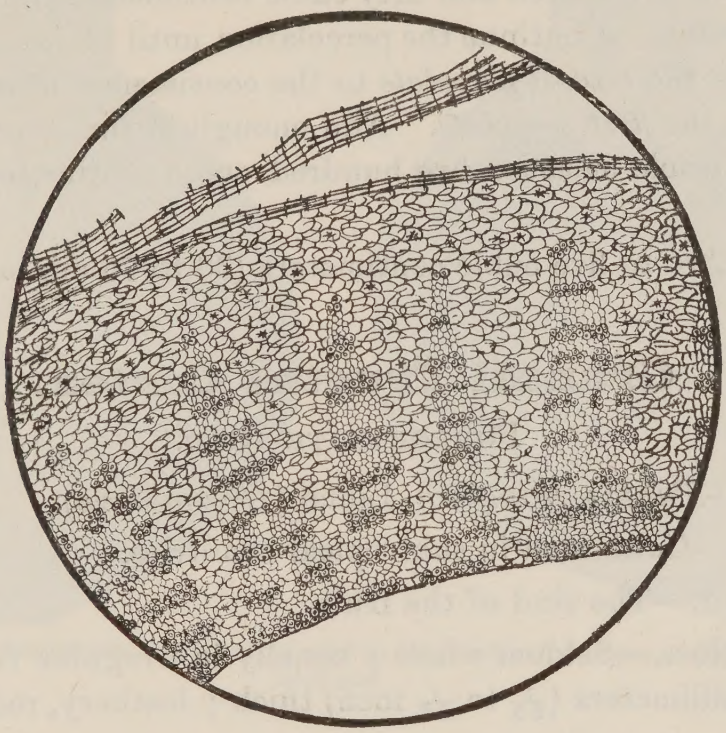


FIG. 284.—Transverse section of Cotton-Root Bark, enlarged.

Dose.—Two to five grams (30 to 75 grains), in the form of fluid extract.

GOSSYPII RADICIS CORTICIS EXTRACTUM.

EXTRACT OF COTTON-ROOT BARK.

Evaporate any desired quantity of the fluid extract (not made with glycerin) to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Dose.—0.05 to 0.30 gram (1 to 5 grains).

GOSSYPII RADICIS EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF COTTON-ROOT BARK.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of three hundred and twenty-five grams (about 13½ fluidounces) alcohol, and one hundred and seventy-five grams (about 6⅙ avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol.

Moisten the drug with two hundred and fifty grams of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Granati Fructus Cortex.

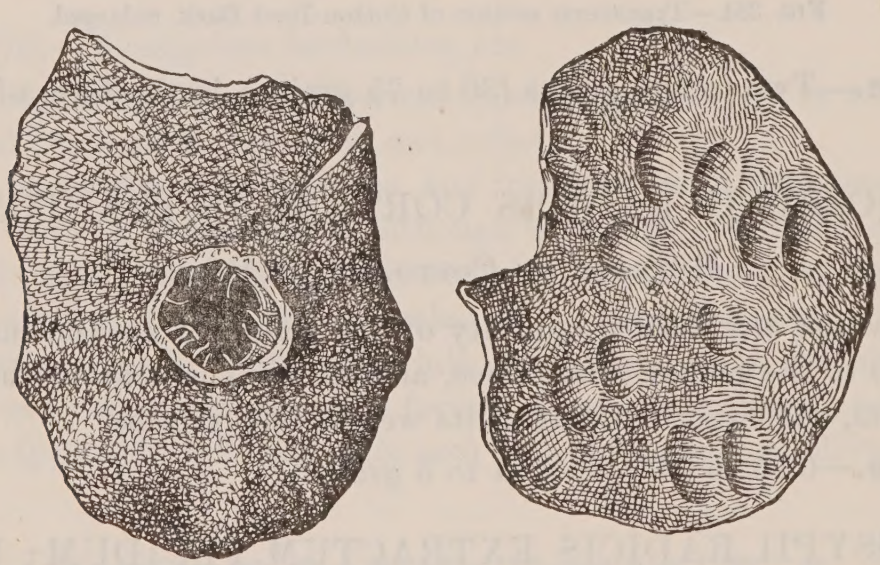
POMEGRANATE RIND.

Origin.—*Punica granatum,* Linné (*Granataceæ*).

Habitat.—Cultivated in subtropical countries.

Part used.—The rind of the fruit.

Description.—Seldom whole ; usually in irregular fragments from one to two millimeters ($\frac{1}{25}$ to $\frac{1}{12}$ inch) thick ; leathery, reddish-brown or



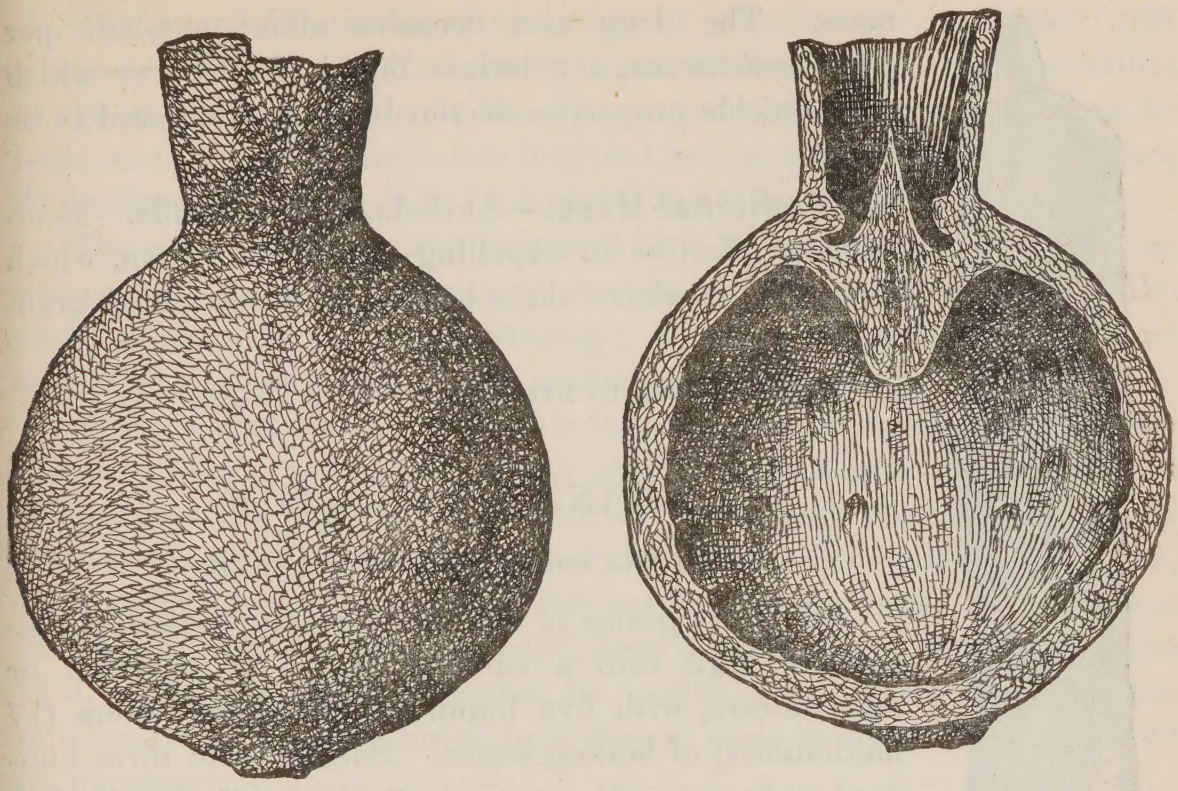
FIGS. 285, 286.—Pomegranate Rind, broken as in drug, outer and inner surface, natural size.

brownish-red externally, lighter on the inner surface ; marked with depressions, as seen in the figure. Odorless ; astringent.

Constituents.—About twenty-eight per cent. tannin.

Medicinal Uses.—Astringent. Used internally, or locally as a gargle or wash, in *diarrhœa* and *relaxed conditions* of the mucous membranes generally.

Dose.—One to two grams (15 to 30 grains) in powder.



FIGS. 287, 288.—Pomegranate Fruit, whole and in longitudinal section, seeds removed, natural size.

Granatum; U. S.

POMEGRANATE.

Granati Radicis Cortex—*Granatwurzelrinde*, G.; *Écorce de la racine de grenadier*, F.; *Granado*, Sp.; *Granatrotbark*, Sw.; *Pomegranate Root Bark.*

Origin.—*Punica Granatum*, Linné (*Granataceæ*).

Habitat.—Cultivated in subtropical countries.

Part used.—The bark of the root.

Description.—See the Pharmacopœia, page 173. Troughs (sometimes whole quills), generally with remnants of the wood adhering. Externally it is grayish-yellow, or brownish-gray, finely wrinkled (when young), or fissured and warty (when from older roots). Has no lichens. It colors the saliva yellow. It loses its activity when long kept; fresh undried bark is best.

The bark of the stem occurs more frequently in whole quills, and has a less abundant cork-formation externally. There are also lichens on the stem bark. It is equal to the root bark in medicinal properties.

Constituents.—From ten to twenty per cent. punico-tannic acid, which has been obtained in the form of an amorphous brownish-yellow

Fig. 289.—Bark of Pomegranate Root, natural size.

mass. The drug also contains about one-half per cent. *pelletierine*, a colorless liquid alkaloid to which the tænicide properties of the bark are supposed to be due.

Medicinal Uses.—Anthelmintic, tænicide. Is especially effective in expelling the tænia solium, which does not live above three hours in a decoction of granate root bark.

Dose.—Two to five grams (30 to 75 grains).

GRANATI DECOCTUM.

Decoction of Pomegranate.

Put sixty grams (2 ounces 50 grains) bruised pomegranate bark into a suitable vessel of porcelain or earthenware, with five hundred cubic centimeters (17 fluidounces) of boiling water. Boil down to three hundred and sixty cubic centimeters (12 fluidounces). Let stand until cold. Strain.

Dose.—One-third to one-half of the above quantity to be taken every hour, and followed in a few hours by castor-oil if necessary. The remedy should be taken on an empty stomach, in the morning.

GRANATI EXTRACTUM FLUIDUM.

Fluid Extract of Granatum.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

TAPE-WORM REMEDY.

The following treatment has proved very successful :

Sixty grams (2 ounces) of pomegranate root bark in coarse powder are boiled with seven hundred cubic centimeters (1½ pint) of water until two hundred cubic centimeters (about 7 fluidounces) of decoction are obtained.

Thirty grams (1 ounce) of pumpkin seeds are deprived of their outer coats and the embryos beaten to a paste with finely powdered sugar.

Two grams (30 grains) of oleo-resin of malefern are emulsified with acacia and the decoction of pomegranate bark, and the emulsion added to the paste of pumpkin seeds, the whole to be flavored according to taste with syrups, to make two hundred and sixty-five cubic centimeters (9 fluidounces), which is to be divided into three equal portions.

The patient having been prepared by a light diet for a day, accompanied by a laxative if necessary, is ordered to take one portion of the above mixture in the early morning ; if this is not sufficient a second and third portion may be taken at three hours' intervals.

When a desire to go to stool is felt, the patient should sit in a lukewarm sitz-bath, so that the worm may be passed into the water. In this manner the expelled portion of the worm does not drag so heavily upon the part still in the bowel, and the parasite is less liable to be torn, so that the head usually glides out easily without being torn off, thus facilitating the finding of the head, even if not assisting in the expulsion of it. The dose may, of course, be modified as required, and the administration may be followed by a dose of some cathartic, if such should be necessary.

Grindelia ; U. S.

GRINDELIA.

Grindelia Robusta.

Origin.—*Grindelia robusta*, Nuttall (*Compositæ*).

Habitat.—California.

Parts used.—The leaves and flowering tops.

Description.—See the Pharmacopœia, page 173. Grindelia robusta has a branched *stem* which is smooth, round, striate. The lower *leaves* are spatulate, tapering at the base, while the upper ones are oblong, pointed, and have broad bases. *Flower-heads* up to nearly twenty millimetres ($\frac{3}{4}$ inch) in diameter, one at the point of each branch of the stem ; resinous ; the receptacle flat, pitted. Flowers yellow.

Most of the "Grindelia robusta" on the market answers the description of Grindelia squarrosa.

Constituents.—Volatile oil and resin.

Medicinal Uses.—Grindelia robusta is used extensively as a remedy in various affections of the organs of respiration. It is often very beneficial in *asthma*, in which disease it exerts its most marked effects. It is also employed in *pertussis*, *bronchitis*, etc. It also possesses diuretic properties, and is useful in *catarrh of the bladder*.

Dose.—One to five cubic centimeters (15 to 75 minims).

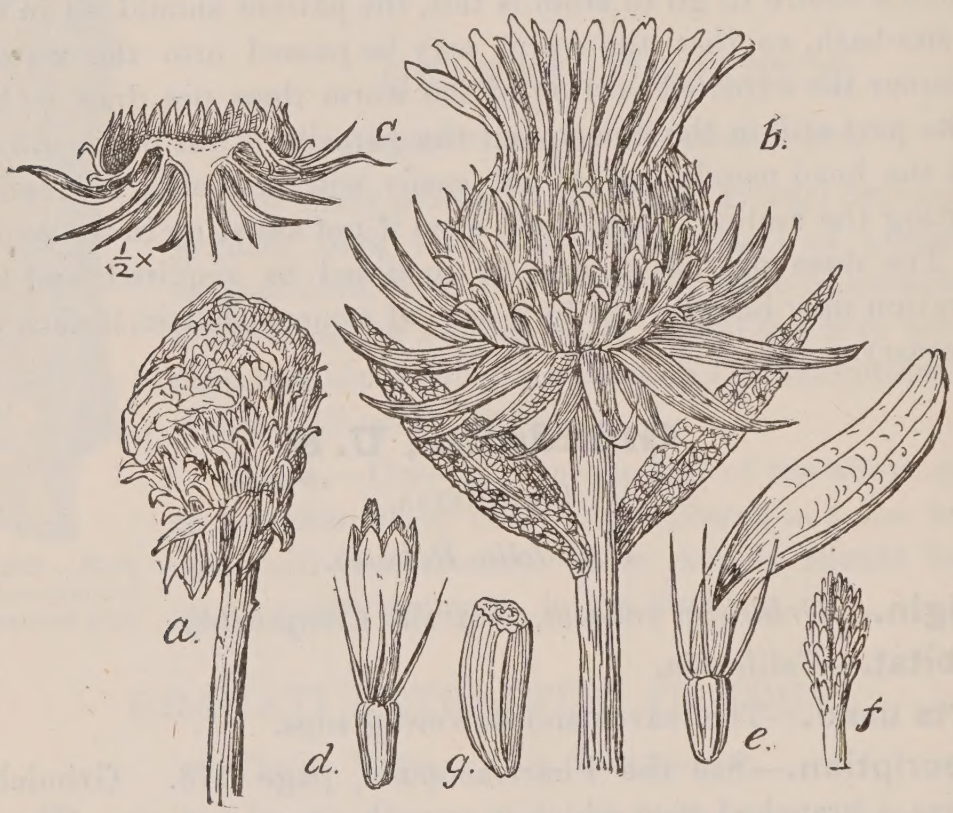
GRINDELIÆ ROBUSTÆ EXTRACTUM.

EXTRACT OF GRINDELIA ROBUSTA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).



FIGS. 290-296.—Grindelia Robusta. *a*, dry, as in trade, natural size; *b*, soaked in water, natural size; *c*, section of receptacle, half size; *d*, disc-floret, enlarged; *e*, ray-floret; *f*, stigma, enlarged; *g*, fruit, enlarged.

GRINDELIÆ [ROBUSTÆ] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF GRINDELIA [ROBUSTA].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces of the menstruum. Pack it tightly in a cylindrical percola-

tor. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

FIGS. 297, 298.—Grindelia Squarrosa, dry as in trade, natural size.

Grindelia Squarrosa.

GRINDELIA SQUARROSA.

Origin.—*Grindelia squarrosa*, Duval (*Compositæ*).

Habitat.—West of the Rocky Mountains.

Parts used.—Leaves and flowering tops.

Description.—Grindelia squarrosa resembles very much the Grindelia robusta, but is considerably smaller. The scales on the flower-heads have recurved points—a feature, however, which is not absent in G. robusta. The species name "Squarrosa" refers to the recurved points of the scales covering the flower-heads as the principal characteristic, and as this is not peculiar to G. squarrosa alone, there seems to be little difference between the two plants except as to size. It has, therefore, recently been considered as simply a variety of G. robusta.

Constituents.—Volatile oil and resin.

NOTE.—Grindelia squarrosa is reported to be an efficient remedy in intermittent and other malarial fevers. It is probable that both species (if they really are distinct species) have similar properties. A great proportion of the drug sold in the market as G. robusta is, in fact, G. squarrosa (Lloyd).

Medicinal Uses, Dose, and Preparations.—Like those of Grindelia robusta.

Guaiaci Lignum; U. S.

GUAIACUM WOOD.

Guajakholz, Pockholz, Franzosenholz, G.; *Bois de Gayac*, F.; *Guayaco*, Sp.; *Pockenholz*, Sw.; *Lignum Vitæ*.

Origin.—*Guaiacum officinale*, Linné, and *Guaiacum sanctum*, Linné (*Zygophyllaceæ*).

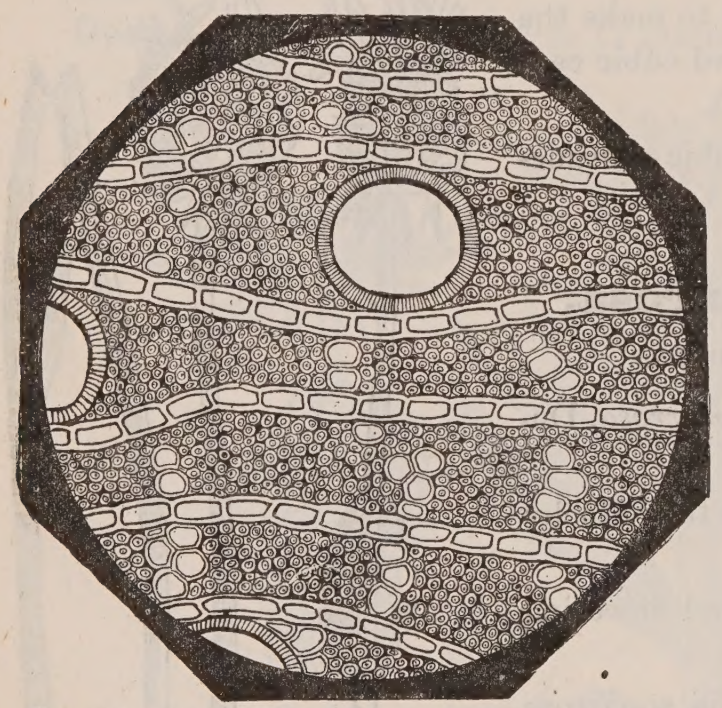


FIG. 299.—Guaiac Wood, transverse section, enlarged.

Habitat. — The West Indies and the northern South American States.

Part used.—The heart-wood.

Description.—See the Pharmacopœia, page 173.

There must be but little of the white-wood in the drug.

Constituents. — From twenty to twenty-six per cent. guaiac resin, which is described under its proper title.

Medicinal Uses.—Same as of the resin. Employed in the form of fluid extract or decoction as an alterative in *syphilis*, etc.; generally in combination with sarsaparilla and iodide of potassium.

GUAIACI LIGNI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF GUAIACUM WOOD.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

GUAIACI SPECIES COMPOSITÆ.

ALTERATIVE SPECIES.

Species ad Infusum Lignorum, Sw.

Mix seventy-five grams (2 ounces 280 grains) cut glycyrrhiza, one hundred and seventy-five grams (6 ounces 75 grains) cut saponaria, three

hundred grams (10 ounces 255 grains) rasped juniper root, and four hundred and fifty grams (15 ounces 382 grains) rasped guaiac wood.

Used as an alterative or "blood-purifier." A tea is made of it and taken *ad libitum.*

Guaiaci Resina; U. S.

GUAIAC.

Guaiac Resin.

Production.—By heating the wood over fire, when the resin melts and runs out, or by boiling the rasped wood in salt water and skimming off the resin which separates.

Description.—See the Pharmacopœia, page 173. Homogeneous, brittle, dark-greenish masses; dull externally from dust, glassy in the fracture. When fused it emits a vanilla-like odor. Readily soluble in alcohol.

Varieties.—*Guaiac in tears* is comparatively scarce, but is cleaner than the *guaiac in masses* described above.

Constituents.—About ten per cent. *guaiacetic acid,* a crystalline substance of a faint vanilla-like odor, readily soluble in alcohol and in ether, but insoluble in water. About seventy per cent. *guaiaconic acid,* a light-brown, amorphous mass, soluble in alcohol and ether, but not in water. A small quantity of *guaiacic acid,* in white crystals; and some *guaiac yellow,* also crystalline. Also ten per cent. *beta-guaiac resin,* insoluble in ether.

Diaphoretic, diuretic, alterative, stimulant.

Dose.—0.50 to 1 gram (8 to 15 grains) three times a day.

GUAIACI MISTURA.

GUAIAC MIXTURE.

Emulsio Guaiaci.

Triturate six grams (90 grains) powdered guaiac resin, six grams powdered sugar, and two grams (30 grains) powdered tragacanth until intimately mixed. Then add gradually and with constant trituration one hundred and fifty cubic centimeters (5 fluidounces) peppermint water.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

GUAIACI TINCTURA; U. S.

TINCTURE OF GUAIAC.

Macerate forty grams (1 ounce 180 grains) coarsely powdered guaiac resin for seven days with one hundred and sixty grams (about 200 cubic centimeters, or 7 fluidounces) alcohol in a bottle. Filter. Add enough alcohol through the filter to make the whole product weigh two hundred grams (7 ounces 24 grains, measuring about 7½ fluidounces).

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm).

GUAIACI TINCTURA AMMONIATA; U. S.

AMMONIATED TINCTURE OF GUAIAC.

Made like the tincture of guaiac, and of the same guaiac strength, using, however, aromatic spirit of ammonia instead of alcohol as a solvent.

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm).

Guarana; U. S.

GUARANA.

Origin.—*Paullinia sorbilis*, Martius (*Sapindaceæ*).

Habitat.—Brazil.

Character.—A dried paste prepared with the crushed seeds, by beating them with water into a pulp and drying.

Description.—See the Pharmacopœia, page 174. Cylindrical sticks, sometimes flattened, about fifteen centimeters (6 inches) long and twenty-five millimeters (1 inch) in diameter; hard, externally dark red-brown, comparatively smooth; fracture uneven, somewhat glossy, much lighter than the external surface, not homogeneous, showing fragments of seeds. Odor feeble but peculiar, reminding of chocolate; taste astringent, bitter. Partially soluble in alcohol and in water, the solutions being brown.

Constituents.—From four to five per cent. of *guaranine*, an alkaloid closely resembling, if not identical with, *caffeine*. Also about twenty-five per cent. tannin, besides traces of volatile oil, saponin, etc.

Medicinal Uses.—Guarana resembles coffee and tea in its action. It is used to relieve *sick headaches*.

Dose.—One to five grams (15 to 75 grains) in powder, or preferably in fluid extract.

GUARANÆ EXTRACTUM.

EXTRACT OF GUARANA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Chocolate brown.

Dose.—0.20 to 1 gram (3 to 15 grains).

GUARANÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF GUARANA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred grams (about 4 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Gutta-Percha; U. S.

GUTTA-PERCHA.

Origin.—*Isonandra gutta,* Hooker (*Sapotaceæ*).

Habitat.—The Malay peninsula and islands.

Character.—The hardened milky juice from the trunks of the trees.

Description.—See the Pharmacopœia, page 174. Marbled, reddish-gray, or yellowish, extremely tough and hard masses, which soften and become plastic by heating, and very soft when put in boiling water. Has a peculiar though faint odor, but no taste. Is insoluble in water or in alcohol, but soluble in chloroform, oil of turpentine, or bisulphide of carbon.

Can be cut with a hot knife.

Uses.—As an ingredient in plasters to render them adhesive. Also in solution as a collodion or protective application.

GUTTA-PERCHÆ LIQUOR; U. S.

SOLUTION OF GUTTA-PERCHA.

Gutta-Percha Collodion.

Put ninety grams (3 ounces) gutta-percha in thin slices into a wide-mouthed quart bottle, with seven hundred grams (24 ounces 300 grains, measuring about 16 fluidounces) commercial chloroform, cork well, and shake occasionally until dissolved. Then add one hundred grams (3¾ ounces) carbonate of lead, previously mixed with two hundred and ten grams (7 ounces 180 grains, measuring about 5 fluidounces) of commercial chloroform. Shake together several times, thoroughly, at intervals of half an hour. Set aside until thoroughly settled and clear. Then decant the clear liquid and keep it in cork-stoppered bottles holding about thirty cubic centimeters (1 fluidounce) each.

The preparation is of a pale straw-color.

Used as an adhesive and protective covering for surfaces. Applied by a brush, when the chloroform evaporates, leaving a coating of gutta-percha.

Gynocardiæ Oleum.

CHAULMOOGRA OIL.

Origin.—*Gynocardia odorata*, Robert Brown (*Bixineæ*).

Habitat.—East India.

Description.—The fixed oil obtained from the seeds by expression. It is granular, whitish, semi-solid, melts at 42° C. (107.6° F.), has an acid reaction; the odor reminds of scammony, and the taste is acrid. With sulphuric acid it produces a green color.

Constituents.—About eighty-one per cent. of palmitic acid, and some hypogœic acid. The constituent upon which its peculiar properties depend is *gynocardic acid*, of which it contains nearly twelve per cent. This has a very acrid taste.

Medicinal Uses.—Recommended for *leprosy*, *scrofula*, *syphilis*, etc., to be used both internally and externally.

Dose.—Fifteen to thirty centigrams (2½ to 5 grains) three times a day, to be given in capsules.

GYNOCARDIÆ UNGUENTUM.

CHAULMOOGRA SALVE.

Mix thirty grams (1 ounce) chaulmoogra oil with one hundred and fifty grams (5 ounces) petroleum ointment.

Hæmatoxylon; U. S.

HÆMATOXYLON.

Hæmatoxyli Lignum — Blauholz, Campecheholz, G.; *Bois de Campêche, Bois d'Inde, Bois de sang*, F.; *Campeche*, Sp.; *Campecheträ*, Sw.; *Logwood.*

Origin.—*Hæmatoxylon campechianum*, Linné (*Leguminosæ*).

Habitat.—Central America and the West Indies.

Part used.—The heart-wood.

Description.—See the Pharmacopœia, page 174. In chips or raspings, heavy, hard, reddish-brown. Odor faint, but peculiar and rather agreeable; taste sweetish, astringent. Colors the saliva purple, and yields a blood-red infusion with water, which is colored purple by tincture of chloride of iron.

Constituents.—Tannin is the principal medicinal constituent. The drug also contains from ten to twelve per cent. of a coloring principle called *hæmatoxylin*, which has been obtained in colorless crystals, and has a persistent sweet taste like that of liquorice. Hæmatoxylin is soluble in water, also in alcohol.

Medicinal Uses.—Astringent and tonic.

HÆMATOXYLI DECOCTUM.

DECOCTION OF HÆMATOXYLON.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

HÆMATOXYLI EXTRACTUM; U. S.

EXTRACT OF HÆMATOXYLON.

Macerate one thousand grams (35 ounces 120 grains) rasped hæmatoxylon (logwood) forty-eight hours with ten liters (21 wine pints) water. Boil in a porcelain or "granite-iron" vessel until one-half of the water has evaporated. Strain while hot, and then evaporate to dryness.

Reddish-brown. Yield about twelve per cent. Should make an almost entirely clear solution with water. Ought to be powdered for convenience in dispensing, as it keeps quite as well in that form. Commercial extract of logwood used for dyeing is not to be used instead of the official extract.

Dose.—0.5 gram (8 grains) or more.

HÆMATOXYLI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HÆMATOXYLON.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Halicoris Oleum.

DUGONG OIL.

Origin.—Species of *Halicore* (*Mammalia*).

Habitat.—The animals yielding dugong oil ("sea-hogs") inhabit the shallow waters of the Indian seas.

Part used.—The oil obtained from the lard.

Description.—Whitish, semi-solid at ordinary temperatures. It is almost inodorous and tasteless when fresh.

Medicinal Uses.—Has been recommended as a substitute for cod-liver oil, and is said to be fully as nutritive while far more palatable.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms) or more during the day.

Hamamelis; U. S.

HAMAMELIS.

Hamamelidis Folia— Witch-Hazel Leaves.

Origin.—*Hamamelis virginica*, Linné (*Hamamelaceæ*).

Habitat.—North America.

Part used.—The *fresh* leaves, collected in the autumn.

Description.—See the Pharmacopœia, page 174. They are inodorous, but have an astringent, bitter taste.

Constituents.—Tannin and some bitter principle. The drug has not been fully investigated chemically.

Medicinal Uses.—Tonic and astringent. Used in *congestions* and *inflammations*, *hemorrhages* and *threatened abortions*. It is said to be almost a specific in *debility of the venous system*. Externally it is used as a wash in old, *indolent*, and *foul ulcers*. An ointment of witch-hazel is employed in *hemorrhoids*.

Dose.—Two to ten grams (30 to 150 grains) in the form of fluid extract or decoction.

HAMAMELIDIS EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF HAMAMELIS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every two hundred grams (about 6⅔ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Used externally for cuts, bruises, etc.

Hamamelidis Cortex.

HAMAMELIS BARK.

Witch-Hazel Bark.

Origin.—*Hamamelis virginica* (see above).

Part used.—The bark of the younger branches.

Description.—Troughs about eight millimeters (⅓ inch) in diameter, and one millimeter (1/25 inch) thick; externally smooth, brown, on the inner surface paler. Odor faint but peculiar; taste astringent.

Constituents.—About eight per cent. tannin.

Medicinal Uses.—Has been used to prevent *miscarriage,* and locally as a wash and application to *wounds, bruises, inflammations, hemorrhoids,* etc.

Dose.—Two to four grams (30 to 60 grains).

HAMAMELIDIS CORTICIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HAMAMELIS BARK.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Hedeoma; U. S.

HEDEOMA.

Pennyroyal.

Origin.—*Hedeoma pulegioides*, Persoon (*Labiatæ*).

Habitat.—North America.

Parts used.—Leaves and flowering tops.

Description.—Stem hairy, four-sided ; leaves glandular on the under surface ; flowers pale blue. Odor strong, mint-like ; taste pungent, aromatic.

Constituents.—Volatile oil is the only important constituent.

Properties.—Stimulant, carminative, and emmenagogue.

Used in *flatulent colic* and with purgatives to prevent *griping*. It is employed in the form of a tea to restore *suppressed menses*.

The fresh herb hung in the rooms is much used to drive away mosquitoes, and a spirit made by dissolving oil of pennyroyal in alcohol is used as an application to the face and hands for the same purpose.

Dose.—Five to ten grams (75 to 150 minims), in decoction.

Hedeomæ Oleum; U. S.

OIL OF HEDEOMA.

Hedeomæ Ætheroleum — Volatile Oil of Hedeoma, Oil of Pennyroyal.

Description.—See the Pharmacopœia, page 237.

Has carminative properties, but is seldom or never used internally.

Dose.—0.1 to 0.3 cubic centimeter (2 to 5 minims).

HEDEOMÆ SPIRITUS.

SPIRIT OF HEDEOMA.

Spirit of Pennyroyal.

Mix thirty grams (1 ounce 25 grains) oil of hedeoma and two hundred and seventy grams (9 ounces 230 grains, or about 11 fluidounces) alcohol.

Used as an external embrocation, or as a spray to keep mosquitoes out of the room.

Helianthemum.

HELIANTHEMUM.

Frostwort, E.; *Canadisches Sonnenröschen*, G.

Origin.—*Helianthemum canadense*, Michaux (*Cistaceæ*).

Habitat.—North America.

Part used.—The whole herb.

Description.—The stem is very slender, stiff, about thirty centimeters (12 inches) high, purplish; leaves alternate, about twenty-five millimeters (1 inch) long, narrow, pointed, woolly on the under surface; has one solitary flower in June with yellow petals, and later a number of smaller flowers without petals in hoary axillary clusters. Odor none; taste bitter, astringent.

Constituents.—Tannin and some bitter substance.

Medicinal Properties.—Bitter tonic and astringent. Has been given in *diarrhœa* and *dysentery*; and as an alterative in *scrofula* and *syphilis*, it is claimed to have achieved marked success.

Dose.—Five to ten grams (1 to 2½ drachms), several times a day, in the form of FLUID EXTRACT made with diluted alcohol as a menstruum.

Helleborus.

HELLEBORUS.

Hellebori Radix, Helleborus Niger, Radix Melampodii—Schwarze Nieswurzel, Weihnachtswurzel, Winterrose, G.; *Svart prustrot*, Sw.; *Black Hellebore, Christmas Rose.*

Origin.—*Helleborus niger*, Linné (*Ranunculaceæ*).

Habitat.—Central and Southern Europe.

Part used.—The rhizome with rootlets.

Description.—The rhizome is knotty, twenty-five to seventy-five millimeters (1 to 3 inches) long, marked by transverse rings, brittle, blackish-brown, grayish within, bark thick, pith large; rootlets long, dark brown, longitudinally wrinkled, very brittle, and covered with a thick bark. Odor, scarcely any except when the drug is freshly bruised, when it has a rancid odor; the dust causes violent sneezing. Taste bitter, acrid.

Constituents.—The most important are two glucosides called respectively *helleborin* and *helleborein*, both crystalline. They are very poisonous. There is also some resin in black hellebore; but no tannin.

Medicinal Uses.—Drastic cathartic, emetic, and emmenagogue. Seldom employed at present. In large doses a powerful poison, producing death by excessive gastro-intestinal irritation.

Dose.—0.25 to 1 gram (4 to 15 grains) in powder.

HELLEBORI NIGRI EXTRACTUM.

EXTRACT OF BLACK HELLEBORE.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.05 to 0.6 gram (1 to 10 grains); the larger doses with great caution.

HELLEBORI NIGRI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HELLEBORUS NIGER.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.25 to 1 cubic centimeter (4 to 15 minims).

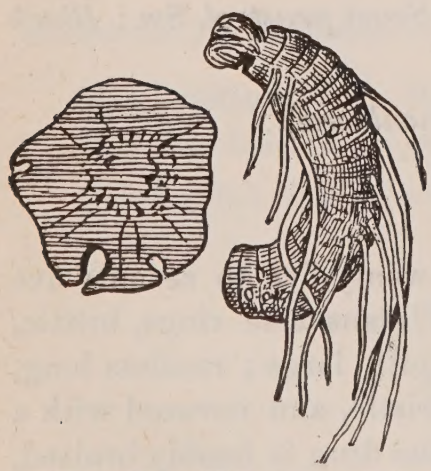


FIG. 300.—Helonias, whole, natural size, and transverse section, enlarged.

Helonias.

HELONIAS.

Heloniæ Radix; Chamælirium—False Unicorn.

Origin.— *Chamælirium luteum*, Gray (*Helonias dioica*, Pursh.) (*Melanthaceæ*).

Habitat.—North America, east of the Mississippi.

Part used.—The root.

Description.—See Fig. 300. It is called *unicorn root* on account of the resemblance the root bears to a horn. Large pieces have peculiar knotty annulations. From twelve to eighty millimeters (½ to 3¼ inches) long, curved, and from six to twenty millimeters (¼ to ¾ inch) in diameter. Exter-

nally dark grayish-brown, transversely wrinkled, with stem scars on the upper side, and beset above and below with long, slender, fibrous rootlets, which are, however, usually absent in the commercial drug. Firm, horny. Odor peculiar, readily perceived when the drug is bruised. Taste bitter, acrid.

Constituents.—A bitter principle called *chamælirin.*

Medicinal Uses.—Said to be tonic and anthelmintic in the dose of one to four grams (15 to 60 grains) in infusion or fluid extract.

HELONIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HELONIAS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.5 to 2 cubic centimeters (10 to 30 minims).

Hemidesmus.

HEMIDESMUS.

Hemidesmi Radix, B.; *Indian Sarsaparilla, Nannari,* E.

Origin.—*Hemidesmus indicus,* Robert Brown (*Asclepiadaceæ*).

Habitat.—India.

Part used.—The root.

Description.—Pieces about thirty centimeters (6 inches) long, and from six to fifteen millimeters (¼ to ⅗ inch) in diameter, tortuous, wrinkled lengthwise, and with fissures forming transverse rings. The external bark is dark-brown, thin ; the inner bark whitish, mealy, thin, containing milk vessels. The wood is separated from the bark by a dark wavy line. Odor pleasantly aromatic, reminding of tonka ; taste sweetish, somewhat acrid.

Constituents.—Probably a little *coumarin,* or some substance resembling it. A little tannin is found in the outer bark.

Medicinal Uses.—Said to be alterative, tonic, diuretic, and diaphoretic. Used like sarsaparilla.

Best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum, of which the **dose** is two to five cubic centimeters (30 to 75 minims).

Hepatica.

HEPATICA.

Liverwort, E.; *Edelleberkraut*, G.

Origin.—*Hepatica triloba*, Chaix (*Ranunculaceæ*).

Habitat.—North America.

Part used.—The leaves.

Description.—Leathery, smooth leaves, dark green on the upper surface, paler on the under side. Inodorous; slightly astringent and bitter.

Constituents.—Mucilage and tannin.

Medicinal Uses.—It has enjoyed some reputation in *chronic bronchitis*, etc.

Dose.—*Ad libitum* in infusion.

HEPATICÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HEPATICA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Heuchera.

HEUCHERA.

Alum Root.

Origin.—*Heuchera Americana*, Linné (*Saxifragaceæ*).

Habitat.—The United States.

Part used.—The root.

Description.—Several-headed, each head with a concave scar, tapering and branched below, about fifteen centimeters (6 inches) long, and twelve millimeters (½ inch) thick, beset with thin radicles. Shrivelled and tuberculate when dry. Purplish-brown externally, bark thin; breaks with a granular short fracture, often disclosing internal cavities. Odor none; taste somewhat bitter and very astringent.

Constituents.—About eighteen to twenty per cent. tannin.

Medicinal Uses.—Astringent. Used in *diarrhœas*, etc. Also as a mouth-wash and gargle, etc.

Dose.—Two to eight grams (30 to 120 grains), best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum.

Hippocastanum.

HIPPOCASTANUM.

Hippocastani Cortex—Horse-chestnut Bark.

Origin.—*Æsculus Hippocastanum*, Linné (*Hippocastaneæ*).

Habitat.—Cultivated in Europe and America.

Part used.—The bark.

Description.—In troughs or quills, externally grayish-brown and marked by triangular leaf-scars, which, however, are not visible on the bark collected from older branches. Bark from young branches (having the scars) is to be preferred. Older bark is blackish, though smooth, beset here and there with corky warts. When the outer bark has been removed, which is sometimes the case, the outside is light brown. On the inner side the bark is smooth and pale yellowish. Devoid of odor. Taste bitter, astringent. The infusion has a blue fluorescence.

Constituents.—Contains a peculiar tannic acid, and two white crystalline neutral bitter principles, *æsculin* and *fraxin*. Æsculin when separated is in small, white needles or prisms, odorless, bitter, readily soluble in boiling water or in alcohol. A solution of one grain of æsculin in one million five hundred thousand grains (over 25 gallons) of water is said to be distinctly fluorescent with a bluish tint.

Medicinal Uses.—Bitter tonic, and said to be antiperiodic. Given in *periodical fevers*, *neuralgias*, etc.

Dose.—Five to ten grams (1 to 25 drachms), best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum.

Hirudo.

LEECH.

Sanguisuga medicinalis, Savigny, and *S. officinalis*, Savigny.

Description.—Full grown it is seventy-five millimeters (3 inches) or more long; round, somewhat flattened; tapering toward the ends, especially forward; olive-green or blackish-green on the back, with six rust-colored, black-spotted stripes; belly yellowish-green, either spotted (*S. medicinalis*) or with one line of black spots on each side (*S. officinalis*). The skin of the S. medicinalis is rough to the feel; that of S. officinalis smooth. Each end consists of a disk—the mouth being the narrower.

The leech lives on blood, which it requires from six months to two years to digest. Only medium-sized leeches (about 8 centimeters, or 3¼ inches long) should be used, and such as have not before been used for drawing human blood. Good leeches are sound, active, quick, and when slightly pressed contract into an oval form.

Leeches may be kept for a long time in clean river water, in suitable vessels, and in the shade. The water should be changed about once a week, and gravel put on the bottom of the vessel, together with some turf, sweet flag, moss, charcoal, etc. The temperature of the water must be 10° to 20° C. (50° to 68° F.). Cleanliness and free access of pure air are necessary to the health of the animals.

In applying leeches the spot to be bled must be washed clean with clean cold water, without any soap. The application of a little sweet milk or a little fresh blood facilitates the business. When the leech has attached itself to the skin, it must be allowed to hang freely suspended. It is capable of drawing its own weight, or more, of blood. The flow of blood, however, continues for some time after the leech has dropped off, which it does as soon as satiated. By warm applications the bleeding can be prolonged.

A leech just gorged with blood may be used again in two or three days, if necessary, if it is made to disgorge the blood immediately after having been used the first time. This is effected by carefully stroking the animal with the finger from the anal end toward the head, or by putting it in a warm (not hot) saucer and sprinkling a little powdered bicarbonate of sodium over it. Then, after it has discharged the blood, wash it in lukewarm water.

Swedish and Hungarian leeches are celebrated. Most medicinal leeches are, however, cultivated.

Used for local blood-letting.

Homatropinæ Hydrobromas.

HYDROBROMATE OF HOMATROPINE.

This is in fine white or colorless crystals, soluble in ten times its weight of water.

Homatropine (or oxytoluyltropine) is obtained by the decomposition of amygdalate of tropine with hydrochloric acid.

Medicinal Uses.—It has the same properties (of dilating the pupil) as atropine, and is preferred on account of its being much less poisonous, and also because the effect of homatropine is of comparatively brief duration, lasting less than twenty-four hours.

Hordeum Præparatum.

PEARL BARLEY.

Origin.—The decorticated fruit of *Hordeum distichon*, Linné (*Graminaceæ*).

Description.—Oval, white grains, presenting brownish-yellow remnants of the hulls along the grooves, and having a mealy appearance externally. Inodorous. Taste insipid.

Contains about sixty to sixty-eight per cent. starch, twelve to sixteen per cent. protein compounds, and two to three per cent. fixed oil. The starch granules resemble those of wheat in size, form, and appearance.

Much used to prepare demulcent drinks and soups for the sick.

HORDEI DECOCTUM.

DECOCTION OF BARLEY.

From thirty grams (or about 1 avoirdupois ounce) of the drug, make five hundred grams (equal to about 17 U. S. fluidounces).

About the same as the preparation of 1870.

Dose.—As a demulcent drink it may be taken *ad libitum;* it may be sweetened and flavored with lemon juice, except in cases of irritation of the stomach or bowels.

HORDEI FARINA.

BARLEY FLOUR.

Fine flour prepared from the seed of *Hordeum distichon*, Linné.

It is a somewhat less pure white color than wheat-flour, but whiter than rye-flour.

For constituents see Hordeum.

HORDEI FARINA PRÆPARATA.

PREPARED BARLEY FLOUR.

This preparation is official in several pharmacopœias. It is made by subjecting barley-flour to the temperature of boiling water for about fourteen hours.

The flour is put into a tin can. The cover is put on securely, and hermetically sealed by soldering it all around. The vessel is then put

into boiling water and kept in it for fourteen hours. Then the flour is taken out.

It is a fine yellowish or pinkish gray flour, of an agreeable, sweet taste, and bread-like odor. Its constituents are similar to those of malt, the starch being changed by the action of the heat. It is an easily digested and nutritious infant's food, especially valuable in the hot season in infantile diarrhœa. Was first recommended by Hufeland.

Humulus; U. S.

Hops.

Humuli Strobili—Hopfen, G.; *Houblon*, F.; *Humla*, Sw.

Origin.—*Humulus Lupulus*, Linné (*Urticaceæ*).

Habitat.—Cultivated.

Part used.—The strobiles.

Description.—The strobiles (or fruit-cones) are about twenty-five millimeters (1 inch) long, yellowish-green; odor strongly aromatic; taste bitter, aromatic.

Fig. 301.—Hops, natural size.

Should be whole and well preserved; not bleached. Old hops sometimes has a disagreeable odor from valerianic acid formed by the oxidation of the volatile oil.

Constituents.—The principal constituent of hops is *lupulin*, which consists of the glands attached to the axis and bracts. (See that title.) Also volatile oil nearly one per cent., from nine to eighteen per cent. resin, and three to four per cent. tannin.

Medicinal Uses.—Bitter tonic, stomachic, and anodyne.

Valuable in many forms of *dyspepsia* as an appetizer, and to allay undue *gastric irritation*.

Hops seem to exert a peculiar calming effect on the genito-urinary organs, for instance in *priapism*, *incontinence of urine*, *seminal emissions*, *chordee*, and the *painful erections* often accompanying gonorrhœa.

Often used externally, either moist with other substances, as with chamomile and linseed meal in poultices, or in dry bags or pillows with cornmeal, applied warm to relieve pain, as in *toothache*, *facial neuralgia*, etc.

Dose.—About one to five grams (15 to 75 grains) in infusion.

HUMULI EXTRACTUM.

EXTRACT OF HOPS.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—About 0.3 gram (5 grains).

HUMULI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HOPS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

HUMULI INFUSUM.

INFUSION OF HOPS.

From fifteen grams (about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to one hundred and fifty cubic centimeters (1½ to 5 fluidounces).

HUMULI SPECIES RESOLVENTES.

RESOLVENT SPECIES.

Mix thirty grams (1 ounce) hops, thirty grams absinthium, thirty grams chamomile, and sixty grams (2 ounces) spearmint.

Used for poultices, or applied dry in a bag.

HUMULI TINCTURA; U. S.

TINCTURE OF HOPS.

Moisten sixty grams (2 ounces 50 grains) hops, in No. 20 powder, with one hundred and twenty grams (about 4½ fluidounces) diluted alcohol; pack it tightly in a cylindrical percolator, and percolate it with diluted alcohol until three hundred grams (10 ounces 255 grains, or about 10½ fluidounces) tincture has been obtained.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Hydrangea.

HYDRANGEA.

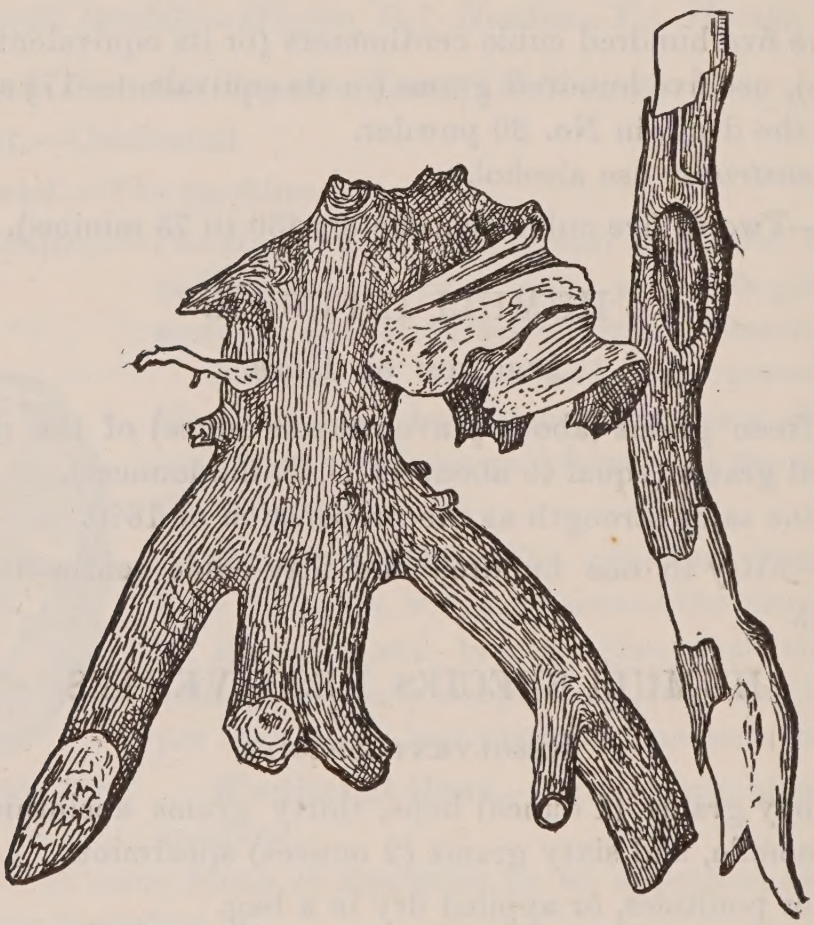
Hydrangeæ Radix.

Origin.—*Hydrangea arborescens*, Linné (*Saxifragaceæ*).

Habitat.—The United States, from the Great Lakes southward.

Part used.—The root.

Description.—Branched, somewhat tuberculous, finger-thick or less, with quite thin pale-brown bark which occasionally peels off in



FIGS. 302, 303.—Hydrangea, natural size.

spots ; wood tough, white. Odor none ; taste insipid, sweetish, afterward somewhat pungent.

Constituents.—No analysis.

Medicinal Uses.—Employed to promote the removal of *gravelly deposits* from the bladder and relieve pain during the passage of renal concretions through the ureters.

It has no good effects in cases of stone in the bladder, but only in cases when the concretions are small and can pass through the urethra.

In large doses it is said to produce cerebral disturbance.

Dose.—Two to five grams (30 to 75 grains), best in fluid extract. A decoction of the root may be taken in doses of 30 to 60 cubic centimeters (1 to 2 fluidounces).

HYDRANGEÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HYDRANGEA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Hydrargyrum ; U. S.

MERCURY.

Quecksilber, G. ; *Mercure*, F. ; *Mercurio, Azogue*, Sp. ; *Quicksilfver*, Sw. ; *Quicksilver*.

Its appearance is familiar. It is soluble in nitric acid without any residue being left. Its specific gravity is fully 13.50. When strongly heated it volatilizes without residue. When dropped on white paper it should roll about freely, separating into numerous globules, which should retain their spherical shape and leave no streaks or traces on the paper. It must be dry and present a bright surface. Mercury full of dust or dirt or moisture may be cleaned and dried by passing it through tall, narrow, paper funnels, best made of good, white, book paper, and having a hole at the narrow end barely large enough to admit a pin, or to allow the mercury to escape in a thin stream.

Commercial mercury generally contains other metals as impurities, among them lead, tin, copper, bismuth, antimony, arsenic. Impure mercury does not "present a bright surface." Globules of mercury contaminated with lead do not retain a perfectly globular form when made to roll about, but leave little tail-like projections behind. A dark-colored dust on the surface of the metal consists of the oxides of foreign metals.

The salts of mercury are poisonous, mercuric salts being more poisonous than the mercurous. The normal salts are generally white ; the basic ones yellow. Mercuric chloride and cyanide, and mercuric and mercurous nitrates, are soluble in water.

Uses.—The crude mercury is used for preparing its several chemical compounds and other mercurial preparations.

HYDRARGYRUM DEPURATUM.

PURIFIED MERCURY.

Pour one thousand grams (35 ounces) mercury into a porcelain evaporating dish. Then pour upon it a mixture of one hundred grams (3½ ounces) nitric acid and five hundred grams (17 fluidounces) water. Macerate four days, stirring frequently and strongly. Then pour off the acid liquid, and wash the remaining metal, first with distilled water acidulated with nitric acid, and afterward with distilled water. When the washings no longer turn blue litmus paper red, dry the mercury by pouring through funnels made of filter paper or blotting paper.

Commercial mercury is always impure, containing other metals (tin, antimony, etc.). These are removed by the nitric acid, which oxidizes them before it attacks the mercury.

Medicinal Uses.—Metallic mercury is seldom given internally as such ; it has been given in *intussusception* and *obstruction of the bowel* in doses up to several pounds. Sometimes the desired relief has followed, and in other cases rupture of the bowel resulted, followed by death.

In the form of mercury, with chalk or blue-mass, it is frequently given as an alterative purgative.

Mercury and mercurials act on the glandular organs, especially the salivary glands, producing profuse discharge of a very offensive saliva, loosening of the teeth, swelling of the tongue, etc.

Mercurials are often given (habitually by some), as cathartics, with the idea that they act on the liver and cause a secretion of bile. By irritating the mucous membranes of the intestines mercurials may, by reflex action, cause a contraction of the gall-bladder and an expulsion of the bile contained in it, just as would result from any other cathartic, but no additional normal bile is secreted in consequence of their action. On the contrary, it is pretty certain that the liver becomes deranged by a long-continued or frequent use of such preparations, and the jaundiced, cadaverous, and cachectic complexions so often met with in "malarial districts" are probably as often caused by an abusive use of calomel and blue-mass as by "malaria." Mercurials may have their sphere of action in *syphilis*, but should not be employed as cathartics when Epsom salts, jalap, and colocynth, etc., will have the good without the deleterious effects of these preparations, unless in some few exceptional cases when special indications may call for a dose of calomel or blue-mass.

Mercurials are frequently given in *inflammations* to prevent the ex-

udation of organizable lymph, or its absorption if already exuded. It is not conclusively shown that mercury possesses any such virtues.

Volumes have been written on the use of mercurials in syphilis, *pro* and *con*, and the authorities are not yet agreed on the subject. Probably the majority of writers agree that mercurials should be given in small doses as soon as the specific nature of the sore has been recognized, and that the patient should be kept under the influence of the drug for some time, but without producing salivation. This can be avoided by giving small doses and suspending the remedy for awhile, as soon as the least soreness of the jaws is felt on forcibly bringing the teeth together.

In *secondary syphilis* the benefits derived from mercury are marked, although even in this form of the disease mercurials, if injudiciously employed, may do great harm, so that many physicians discard these preparations entirely, claiming to cure syphilis without the use of any mercurials whatsoever. While such cures may undoubtedly take place, the mercurials are a valuable, though dangerous remedy, capable of doing great good when used by an intelligent physician, and not merely as a matter of routine.

Their use is indicated in the *secondary* or *cutaneous lesions* of *syphilis*, and less so in the tertiary stage, when iodides are to be preferred.

Mercurials may be introduced into the system in various manners—by inunction, fumigation, hypodermic injection, and internally.

We will mention some of the special uses of mercurials when speaking of the various preparations.

Toxic Effects and Antidotes.—Workers in mercury are subject to a chronic poisoning which is difficult to counteract. The symptoms are abdominal pains, vomiting, diarrhœa, weakness even to the extent of paralysis, salivation, and cachexia. The blue line along the edge of the gums, which generally is the result of poisoning by any of the metallic salts, is present in this case also.

Albuminuria is frequently present, and in women suffering from chronic mercurial poisoning, abortions will be far more frequent than births, if conception follows intercourse at all.

Abortions, it is said, will even result, in many cases, if conception has taken place by the fertilization of a healthy ovum in a healthy female by semen from a man working in metallic mercury.

This condition can only be cured by quitting the occupation which exposes the patient to the continued action of the metal, and by placing the patient in the best possible hygienic conditions, administering bitter tonics, chlorate of potassium, prescribing baths, etc.

In acute poisoning the symptoms are those produced by irritant

poisons. Corrosive sublimate is most frequently the cause of such acute mercurial poisoning. A toxic dose is followed by a sensation of constriction of the throat and a metallic taste in the mouth, which appears as if it had been cauterized with nitrate of silver or creosote.

The other symptoms are those of violent gastro-intestinal irritation, colic, vomiting of the contents of the stomach or of mucus and blood, purging, straining at stool, hemorrhage from the bowel, cold clammy skin, weak pulse, collapse, and finally death, often preceded by convulsions.

As soon as possible after the taking of a poisonous dose of a mercurial salt, white of egg, milk, and wheaten flour should be given. White of egg forms an albuminate of mercury, which is not totally insoluble in the intestine; in fact is quite soluble, but less so than the salt itself, and the administration of albumen should therefore be followed promptly by emetics or the stomach-pump. The latter is not easily applied on account of the corroded condition of the œsophagus.

After-treatment must be conducted on general principles to counteract the inflammation ; demulcents, mucilage, oils, and opium, together with stimulants, may be used.

MERCURIAL FUMIGATION.

Mercurial Vapor Bath.

A mixture is used consisting of five grams (75 grains) black oxide of mercury, five grams red oxide of mercury, and five grams true cinnabar (red sulphide of mercury).

HYDRARGYRI EMPLASTRUM; U. S.

Mercurial Plaster.

Melt thirty grams (1 ounce) resin in thirty grams (1 ounce) olive oil and stir together. When cool triturate with the mixture ninety grams (3 ounces) mercury until all globules have disappeared. Then add one hundred and fifty grams (5 ounces) lead plaster, previously melted, and mix the whole together thoroughly.

Contains about ten per cent. more lead plaster than the mercurial plaster of 1870.

A discutient application in *glandular swellings*, *syphilitic nodes* and *gummata*, *enlarged spleen* or *liver*, etc.

HYDRARGYRI LINIMENTUM.

Liniment of Mercury.

Melt thirty grams (1 ounce) ointment of mercury in thirty grams (1 ounce) camphorated oil ; mix well ; then add thirty grams (1 fluidounce) water of ammonia and shake the whole thoroughly together.

HYDRARGYRI MASSA; U. S.

MERCURY MASS.

Pilulæ Hydrargyri, Phar. 1870—*Blue-Mass, Blue-Pill.*

Triturate three hundred and thirty grams (11 ounces 280 grains) mercury with three hundred and forty grams (12 ounces) honey of roses and thirty grams (1 ounce 25 grains) glycerin until extinguished. Then incorporate gradually fifty grams (1 ounce 334 grains) powdered glycyrrhiza and two hundred and fifty grams (8 ounces 358 grains) powdered althæa, and triturate the whole until globules of mercury are no longer to be discovered by means of a lens magnifying ten diameters.

Employed for the same purposes as calomel. Much used as a mercurial cathartic.

Dose.—0.25 to 1 gram (4 to 15 grains).

HYDRARGYRI SUPPOSITORIA; B.

MERCURY SUPPOSITORIES.

Mix six grams (90 grains) ointment of mercury, two grams (30 grains) benzoinated lard, two grams (30 grains) white wax, and eight grams (120 grains) cacao butter, and from this mixture make eighteen suppositories, each weighing one gram (15 grains).

HYDRARGYRI UNGUENTUM; U. S.

MERCURIAL OINTMENT.

Blue-Ointment.

Mix four hundred and fifty grams (15 ounces 382 grains) mercury with forty grams (1 ounce 180 grains) compound tincture of benzoin, adding also one hundred grams (3 ounces 230 grains) old mercurial ointment containing one-half mercury, and triturate the whole until all globules of mercury have disappeared. Then add two hundred and twenty-five grams (7 ounces 410 grains) lard and two hundred and twenty-five grams suet, previously melted together and allowed to become partially cooled, and continue the trituration until no globules of mercury can be discovered with a lens magnifying ten diameters.

Mercurial ointment can be made as well by the above method as by any other formula adapted to small operations.

Good mercurial ointment has a bluish color and is perfectly homogeneous, not too soft, and free from any rancidity.

Manufacturers sell two kinds of mercurial ointment—one containing

one-half mercury and one containing one-third mercury. The former is the only kind recognized by the Pharmacopœia, and the only one that can be properly dispensed for medicinal purposes.

Uses.—This ointment is often employed for the purpose of obtaining the constitutional effects of mercury in *syphilis*, especially in children. It may be rubbed upon the skin of the inner surface of the thighs, the axilla or chest, or be applied by spreading on a cloth and applying around the body. If the patient cannot make friction himself, the attendant should protect his hands by using rubber gloves.

Blue-ointment is also used to disperse *indurations* and *glandular swellings*, *enlargement* of the *liver* or *spleen;* also to destroy *parasites* as lice or fleas, etc.

HYDRARGYRUM CUM CRETA; U. S.

MERCURY WITH CHALK.

Mix thirty-eight grams (1 ounce 150 grains) mercury, twelve grams (185 grains) sugar of milk, and twelve grams prepared chalk in a Wedgewood mortar; moisten these ingredients with a mixture of four cubic centimeters (1 fluidrachm) alcohol and five cubic centimeters (1¼ fluidrachm) ether, and triturate briskly. Gradually add thirty-eight grams (1 ounce 150 grains) more of prepared chalk, dampen the mass with a mixture of alcohol and ether as before, and continue the trituration until no longer any globules of mercury are visible under a magnifying power of ten diameters, and the powder is of uniform gray color and dry.

On a small scale this process works probably better than any other with which we are acquainted. The mercury strength of the preparation is very nearly the same as of the preparation of 1870, which contained thirty-seven and one-half per cent., while the new one contains thirty-eight per cent.

Frequently employed in the *diarrhœas* of children, especially when the discharges are sour.

Dose.—0.03 to 0.75 gram (½ to 12 grains).

Hydrargyri Chloridum Corrosivum; U. S.

CORROSIVE CHLORIDE OF MERCURY.

Hydrargyricum Chloridum—Mercuric Chloride, Corrosive Sublimate, Bichloride of Mercury.

Description and Tests.—See the Pharmacopœia, page 175.

Reaction acid, unless chlorides of the alkali metals are present. Soluble in sixteen parts of water and in three parts alcohol at 15° C. (59°

F.) ; it dissolves in two parts boiling water and one and one-sixth part boiling alcohol, and in from three to four parts ether.

It must be kept in tightly closed bottles of glass.

When corrosive chloride of mercury is wanted in solution, it will be found necessary to rub it up into rather fine powder in order to be able to dissolve it without too great delay. Powdered mercuric chloride is also required for other purposes occasionally. It is best powdered by trituration in a large, shallow, Wedgewood mortar, when, to prevent the poisonous dust from diffusing itself through the room, or from rising so as to be inhaled by the operator, the salt should be kept moist with alcohol during the entire process.

SOLUTION FOR DISPENSING PURPOSES.

Dissolve fifty grams (1 ounce 334 grains avoirdupois) of the mercuric chloride in enough boiling distilled water to make the finished solution measure one liter (33 fluidounces, 6 fluidrachms, and 24 minims). Filter.

Each cubic centimeter of the solution contains 0.05 gram (5 centigrams) of the corrosive sublimate ; twenty-one minims contains one grain.

Medicinal Uses.—Often employed in the earlier stages of *syphilis* as soon as the specific nature of the sore can be established. Also a very useful form of mercury for hypodermic injection in *secondary syphilis*. For the latter purpose 0.005 gram ($\frac{1}{12}$ grain) may be used once a day, and the injection should be made in the small of the back, because that region is least sensitive to pain, and abscesses are less likely to follow. The effects on the skin lesions are often surprisingly prompt and successful.

Internally it is given in pill or solution. It is chemically incompatible with alkalies and their carbonates, lime-water, various astringent vegetable infusions, including cinchona, other mineral salts, etc.

Iodide of potassium is said to be incompatible ; it is so chemically, but not therapeutically, as the iodide of mercury is formed and dissolved in the excess of iodide of potassium, and the resulting solution is very active.

White of egg is also stated to be incompatible, but the albuminate of mercury is only inactive while it remains in the stomach, but is easily dissolved in the alkaline intestinal fluids. The action of the remedy is therefore only retarded, but not prevented, by albumen, and when albumen is given as an antidote, in cases of poisoning, the resulting albuminates must be promptly gotten rid of by emetics, etc.

The statement has been made that corrosive sublimate is gradually changed to calomel if dissolved with compound syrup of sarsaparilla, which is a favorite menstruum. We doubt the truth of the statement.

We have already described the poisonous action and the antidotal treatment under the title Hydrargyrum.

Dose.—0.004 to 0.006 gram ($\frac{1}{16}$ to $\frac{1}{10}$ grain).

HYDRARGYRI CHLORIDI LIQUOR; B.

Solution of Corrosive Sublimate.

Dissolve 6.5 centigrams (1 grain) corrosive chloride of mercury, and 6.5 centigrams (1 grain) ammonium chloride in sixty cubic centimeters (2 fluidounces) distilled water.

Dose.—Two to five cubic centimeters (30 to 80 minims). Does not keep.

HYDRARGYRI LOTIO FLAVA.

Yellow Wash.

Aqua Phagadenica.

Triturate one gram (15 grains) corrosive chloride of mercury until reduced to fine powder ; then add gradually, with constant trituration, two hundred and fifty cubic centimeters ($8\frac{1}{2}$ fluidounces) lime-water.

Used externally as a wash, or as a dressing by lint soaked in it, in cases of *chancres, chancroids, syphilitic ulcers,* etc.

Hydrargyri Chloridum Mite ; U. S.

Mild Chloride of Mercury.

Hydrargyrosum Chloridum—Mercurous Chloride, Calomel, Subchloride of Mercury, Submuriate of Mercury—Protochloride of Mercury.

Description and Tests.—See the Pharmacopœia, page 176. By heating and by long trituration calomel acquires a yellowish tint.

Varieties.—So-called " English calomel " (made by Howard & Sons, and also by others) is condensed in large chambers into which steam is injected while the sublimation is in progress. The product obtained by this process is generally, but not necessarily always, pure. In this country it brings the highest price.

By "American calomel" we understand in our country calomel made y sublimation without the use of steam in condensing. Although this oes not bring as high a price as English calomel it may well be quite s pure.

Besides these two *sublimed* calomels there is also a *precipitated calmel*, made by precipitating a solution of basic mercurous nitrate with ydrochloric acid. Precipitated calomel, when well and carefully made, sing largely diluted solutions, is whiter than the *sublimed calomel*, and extremely finely divided. It can, therefore, be washed perfectly free rom corrosive chloride of mercury, which is the principal impurity found all kinds of calomel.

Should be kept in well-closed bottles in a dark place.

Medicinal Uses.—Calomel is very frequently employed as a merurial purge, and is given in a great variety of affections. It is given t the beginning of *fevers* and *inflammations*. For this purpose it was ormerly given more often than now, for the majority of the profession re realizing the fact that in many cases in which calomel will do good y its cathartic action, other remedies will do better.

In some cases of *pleurisy* or *pneumonia* absorption of exuded lymph, tc., may perhaps be promoted by calomel, especially if the patient is yphilitic.

Calomel has one advantage over other purgatives, which is, that often it can be given when the stomach rejects all other cathartic remedies. his may sometimes lead to its use when it is not specially indicated therwise.

In *syphilis* small doses of calomel frequently repeated will promptly ause the constitutional effect of the drug. It is very apt, however, to roduce salivation.

Calomel is said to be incompatible with alkalies and their carbonates, lkaline earths, and many of the salts of metals, as of iron, copper, or ead. While it may be chemically incompatible with alkalies, it should e borne in mind that calomel is insoluble, and is not acted on until it is ecomposed by the alkaline intestinal fluids, when oxide of mercury is ormed, to which probably the active properties of calomel are due. odine forms with it the red iodide, and as this is very active, the two ubstances must not be given together.

Nitro-muriatic acid should not be given at the same time, as corroive sublimate may be formed, and even the chlorides of sodium, potasium, or ammonium may produce the same effect.

Dose.—0.005 to 1 gram ($\frac{1}{12}$ to 15 grains), often combined with jalap r colocynth when used as a purgative.

HYDRARGYRI LOTIO NIGRA.

Black Wash.

Aqua Mercurialis Nigra.

Triturate one gram (15 grains) mild chloride of mercury in a mortar with one hundred and fifty cubic centimeters (5 fluidounces) lime-water gradually added.

HYDRARGYRI CHLORIDI MITIS PILULÆ.

Calomel Pills.

Calomel, two grams (30 grains) ; manna, one gram (15 grains) ; and compound tragacanth powder, one gram. Mix. Divide into pills according to the dose required.

PILULÆ CATHARTICÆ COMPOSITÆ; U. S.

Compound Cathartic Pills.

Mix 8.40 grams (130 grains) compound extract of colocynth, 6.50 grams (100 grains) abstract of jalap, 6.50 grams calomel, and 1.60 gram (25 grains) gamboge in fine powder. Add enough water to form the pill-mass, and divide it into one hundred pills.

Dose.—One to three pills.

HYDRARGYRI CHLORIDI MITIS UNGUENTUM.

Calomel Ointment.

Mix five grams (77 grains) calomel and fifty-five grams (1 ounce 410 grains) benzoinated lard.

HYDRARGYRI CHLORIDI MITIS UNGUENTUM COMPOSITUM.

Belville Ointment.

Mix fourteen grams (216 grains) calomel, seven grams (108 grains) acetate of lead, 3.50 grams (53½ grains) red oxide of mercury, and 75.5 grams (2 ounces 290 grains) petroleum ointment.

Hydrargyri Cyanidum; U. S.

Cyanide of Mercury.

Hydrargyricum Cyanidum—Mercuric Cyanide.

Description and Tests.—See the Pharmacopœia, page 176.

Medicinal Uses.—It is an exceedingly violent poison, and as it possesses no advantages in *syphilis* over milder mercurial preparations, it should not be used internally.

Dose.—0.004 to 0.015 gram ($\frac{1}{16}$ to $\frac{1}{4}$ grain).

Hydrargyri Iodidum Rubrum; U. S.

RED IODIDE OF MERCURY.

Hydrargyricum Iodidum—Mercuric Iodide, Biniodide of Mercury.

Dissolve nine hundred grams (31 ounces 327 grains) of corrosive chloride of mercury in fifteen liters (nearly 32 pints) of hot distilled water, and filter the solution. To enable the solution of the corrosive chloride of mercury within a reasonable length of time it must first be rubbed into powder in a Wedgewood mortar, being kept moist with alcohol during the powdering.

Dissolve eleven hundred grams (38 ounces 350 grains) of iodide of potassium in three liters (6⅓ pints) distilled water, and filter the solution.

When the solution of corrosive chloride of mercury has become cold, pour it into the solution of the iodide of potassium during constant stirring. The solution of iodide of potassium should be put in a jar capable of holding at least twenty liters (say a six- or ten-gallon jar), and the solution of chloride of mercury then added. It will not do to add the solution of iodide of potassium to the solution of mercuric chloride, as the solution of iodide of potassium must at all times during the process be in excess of the mercuric chloride with which it comes in contact in order to obtain a pure product. For the same reason it is also quite necessary to stir constantly. If these precautions are not attended to the product will be likely to be contaminated with a compound of chloride with iodide of mercury. To omit filtering the solution may result in a contamination of the product with mercurous chloride besides mechanical impurities.

The precipitated red iodide of mercury is washed with distilled water on a muslin filter until the washings cease to give a precipitate with test-solution of nitrate of silver, and is then dried at not above 40° C. (104° F.).

Preservation.—Must be kept in well-stopped bottles, in a dark place.

Description and Tests.—See the Pharmacopœia, page 177.

Medicinal Uses.—It is seldom employed for internal use, as it is too violent and irritant a poison. If used, it is only for constitutional effects in *syphilis.*

More frequently used externally in ointment in *syphilitic swellings, lupus*, etc.

Dose for internal use, 0.004 gram (1/16 grain).

HYDRARGYRI IODIDI RUBRI UNGUENTUM.

Ointment of Red Iodide of Mercury.

Mix one gram (15 grains) red iodide of mercury with thirty grams (1 ounce 25 grains) petroleum ointment.

Hydrargyri Iodidum Viride : U. S.

Green Iodide of Mercury.

Hydrargyrosum Iodidum—Mercurous Iodide ; Hydrargyri Iodidum Flavum—Protiodide of Mercury.

Pour thirty grams (1¼ fluidounce) alcohol into a Wedgewood mortar containing eighty grams (2 ounces 360 grains) mercury. Add, in several successive portions, during constant trituration, fifty grams (1 ounce 334 grains) iodine, keeping the mixture constantly moist by the addition of more alcohol from time to time, as may be necessary, and taking care that the mass neither gets too hot nor is exposed to strong light during the process. Continue the trituration until all globules of mercury have disappeared and the mixture has become nearly dry and acquired a greenish-yellow color. Then add sufficient alcohol to reduce the whole to a thin paste; pour this into a bottle, let it stand for several days, and then wash the insoluble powder twice with fifty grams (2 fluidounces) warm alcohol each time, and decant the washings. Transfer the iodide to a filter and continue washing with warm alcohol until the washings are no longer affected by hydrosulphuric acid. Finally, dry the product in a dark place at a temperature not above 40° C. (104° F.).

Preservation.—Must be kept in well-closed bottles, in a dark place.

Description and Tests.—See the Pharmacopœia, page 178. It is not a green but greenish-yellow heavy powder.

Medicinal Uses.—This preparation is milder and safer in its action than the red iodide. It is preferred by many to all other mercurials in *secondary syphilis*, and is often combined with extract of hyoscyamus to prevent griping, which sometimes follows its administration. It is less apt to salivate than calomel. It is the best form in which to give mercurials for any great length of time.

Dose.—0.01 to 0.05 gram (⅙ to 1 grain), in pill, one to three times a day.

Hydrargyri Nitratis Liquor; U. S.

SOLUTION OF NITRATE OF MERCURY.

Hydrargyrici Nitratis Solutio—Solution of Mercuric Nitrate.

Dissolve forty grams (1 ounce 180 grains) red oxide of mercury in a mixture of four hundred and fifty grams (15 ounces 380 grains) nitric acid and one hundred and fifty grams (5 fluidounces) distilled water.

Description.—A clear, nearly colorless solution, with a slight odor of nitric acid, and a specific gravity of 2.10. It contains about fifty per cent. mercuric nitrate.

About the same strength as the preparation of the old Pharmacopœia (1870).

Must be kept in glass-stoppered bottles.

A two-ounce bottle holds over a quarter pound.

Medicinal Uses.—Powerfully escharotic and caustic. Destroys the tissues with which it comes into contact, and is used as an application to *chancres, syphilitic vegetations, malignant pustules, indolent ulcers, cancerous growths, ulcers of the neck of the womb,* etc. Never used internally.

Hydrargyri Nitratis Unguentum; U. S.

OINTMENT OF NITRATE OF MERCURY.

Citrine Ointment.

Heat three hundred and eighty grams (13 ounces 180 grains) lard oil in a porcelain evaporating dish to about 70° C. (158° F.), then add, without stirring, thirty-five grams (1 ounce 100 grains) nitric acid, and continue the heat as long as there is a moderate effervescence. Then let the mixture cool.

Dissolve thirty-five grams (1 ounce 100 grains) mercury in fifty grams (1 ounce 330 grains) nitric acid with the aid of heat, keeping the solution warm so as to prevent it from crystallizing, and add this solution to the mixture of lard and nitric acid before it gets cold. Stir well with a porcelain or horn spatula until thoroughly mixed and cold.

This formula yields a much better product than that of the Pharmacopœia of 1870, though both formulæ will succeed in careful, experienced hands, and might fail in unexperienced one's. The new formula is less liable to failure. The danger lies in getting the mixture too hot, whereby the mercury becomes reduced and the product discolored.

When well made the citrine ointment will keep for many months if put in a cool place.

It should have a bright lemon-yellow color.

Used as an external application in various *skin diseases*, especially if of a chronic nature or of syphilitic origin.

HYDRARGYRI NITRATIS UNGUENTUM DILUTUM.

DILUTED CITRINE OINTMENT.

Mix thirty grams (1 ounce) ointment of nitrate of mercury with one hundred and twenty grams (4 ounces) petroleum ointment.

Used as an inunction for the destruction of lice or other *parasites*, microscopic vegetable organisms producing *skin diseases*, and in *syphilis*.

Hydrargyri Oleatum; U. S.

OLEATE OF MERCURY.

Heat ninety grams (3 ounces 76 grains) oleic acid in a porcelain evaporating dish to near 40° C. (104° F.), but not above that degree of temperature; then add gradually ten grams (154 grains) yellow oxide of mercury, and continue stirring until dissolved.

The temperature named in the Pharmacopœia (74° C., or 165° F.) is entirely too high, and will cause reduction of mercury.

The preparation is a solution of oleate of mercury in an excess of oleic acid. It is a dark reddish-brown, clear, thick, oily liquid. Contains ten per cent. mercuric oxide.

Oleate of mercury containing twenty per cent. mercuric oxide may be made in the same manner, using four parts oleic acid and one part yellow oxide of mercury; and a solution of five per cent. mercuric oxide may be made by mixing equal parts of the official preparation and petroleum ointment.

In our judgment a far better preparation is obtained by double decomposition between oleate of potassium and mercuric nitrate. The product obtained in that manner will not contain an excess of oleic acid and instead of being an oily liquid may be mixed with petroleum ointment to give it the consistence of an ointment, by which means it keeps perfectly. The product of the official process is very liable to turn rancid and become extremely irritating in its effect.

Medicinal Uses.—This preparation has been found useful as an external inunction in cases in which mercurial applications are indicated as in *syphilis*, *phytoses*, *alopecia*, *psoriasis*, *pityriasis*, etc. It is espe

cially useful in the *syphilitic affections;* also in *glandular swellings* and *swollen joints.*

The great advantage of this preparation over ordinary ointments consists in the ease with which this substance is absorbed by applying to the skin without friction.

Hydrargyri Oxidum Flavum; U. S.

YELLOW OXIDE OF MERCURY.

Hydrargyricum Oxidum Præcipitatum—Precipitated Mercuric Oxide, Yellow Mercuric Oxide.

Dissolve one hundred grams (3 ounces 230 grains) corrosive chloride of mercury in two liters (4¼ pints) of warm distilled water and filter the solution. Pour the filtrate into nine hundred grams (31 ounces 330 grains avoirdupois) solution of potassa, previously diluted with two liters (4¼ pints) water, stirring constantly. Set the whole aside for twenty-four hours. Then decant the clear liquid from the precipitated oxide, and wash the latter repeatedly by affusion and decantation of distilled water, using about two or three liters water each time. Continue the washing on a strainer until the washings are no longer affected by test-solution of nitrate of silver. Let the precipitate drain, and dry it at not over 40° C. (140° F.) in a dark place.

Diluted solutions, such as described above, are necessary in order to avoid basic chloride, which is brick-red. To let the precipitate remain in contact with the liquid, which contains an excess of solution of potassa, improves the color, probably on the same grounds. It is also necessary to pour the mercuric chloride solution into the solution of potassa, and not *vice versa.* (Compare the notes under Red Iodide of Mercury.)

Preservation.—Must be kept in well-closed bottles, protected from light.

Description and Tests.—See the Pharmacopœia, page 178. It is a heavy, orange-yellow, impalpable powder, which darkens on exposure to light. It is distinguished chemically from the red oxide of mercury by forming a white oxalate when digested for fifteen minutes on a water-bath with a strong solution of oxalic acid.

Nomenclature.—It is curious enough that we should have an official precipitated oxide of mercury which is not called a precipitate, and another official oxide of mercury, called "red precipitate," which is not a precipitate.

Medicinal Uses.—Employed externally in ointment to stimulate

indolent venereal ulcers. Also applied to *granular lids* as an "eye-salve." Being an impalpable powder, the yellow oxide of mercury is to be preferred for these purposes to the red oxide, which is apt to be coarse and irritating unless triturated with extreme care in making the ointment.

HYDRARGYRI OXIDI FLAVI UNGUENTUM; U. S.

Ointment of Yellow Oxide of Mercury.

Mix thoroughly ten grams (154 grains) yellow oxide of mercury with ninety grams (3 ounces 76 grains) simple ointment, adding the latter gradually and triturating the whole until intimately combined.

Must always be freshly made when wanted for use. Either petroleum ointment, fresh (unsalted) butter, or glycerite of starch would be a better vehicle for the external application of oxide of mercury.

Hydrargyri Oxidum Rubrum; U. S.

Red Oxide of Mercury.

Hydrargyricum Oxidum Rubrum—Red Mercuric Oxide, Red Precipitate.

Description and Tests.—See the Pharmacopœia, page 179. Heavy orange-red, brilliant, crystalline scales, or a brick-red powder. Digested on the water-bath with a strong solution of oxalic acid it does not change color, wherein it differs from the yellow oxide of mercury.

Varieties.—Made on a large scale the red oxide of mercury is obtained in brilliant crystalline scales; on a small scale it is obtained as a brick-red crystalline or granular powder. It may be perfectly pure in either form.

Medicinal Uses.—Similar to those of the yellow oxide of mercury. Seldom given internally.

Dose.—0.005 gram ($\frac{1}{12}$ grain) three times daily.

HYDRARGYRI OXIDI RUBRI UNGUENTUM; U. S.

Ointment of Red Oxide of Mercury.

Triturate ten grams (154 grains) red oxide of mercury thoroughly with ninety grams (3 ounces 76 grains) simple ointment, using at first only a small quantity of the ointment, and reducing the mercuric oxide to a very fine state of division with that before adding the remainder. Mix the whole perfectly.

Spermaceti ointment, petroleum ointment, and fresh (unsalted) butter make better vehicles for mercuric oxide than simple ointment or lard.

Hydrargyri Subsulphas Flavus; U. S.

YELLOW SUBSULPHATE OF MERCURY.

Hydrargyricus Sulphas Flavus — Yellow Mercuric Sulphate, Yellow Sulphate of Mercury, Turpeth Mineral.

Description and Tests.—See the Pharmacopœia, page 179. A heavy, lemon-yellow powder.

Medicinal Uses.—Turpeth mineral is an irritant emetic. It has been employed internally in *spasmodic laryngitis* (pseudo-croup) to cause vomiting, but any other emetic which will cause nausea and relaxation will do as well, without incurring the risk attending the use of this powerful remedy. Many physicians consider its use dangerous.

Dose as an emetic is 0.1 to 0.2 gram (2 to 3 grains) for a child.

Hydrargyri Sulphas.

SULPHATE OF MERCURY.

Hydrargyricus Sulphas—Mercuric Sulphate.

Prepared by heating mercury with sulphuric acid.

A heavy, white, crystalline salt, which, when thrown into a considerable quantity of water, is decomposed with the precipitation of yellow subsulphate of mercury (basic mercuric sulphate).

Uses.—For preparing corrosive sublimate, calomel, and yellow subsulphate of mercury.

Hydrargyri Sulphidum Nigrum.

BLACK SULPHIDE OF MERCURY.

Æthiops Mineralis.

Obtained by triturating together equal parts by weight of mercury and sulphur until all globules of mercury have disappeared.

It is a black, fine powder, consisting of black amorphous mercuric sulphide and sulphur.

Not used to any extent in this country.

Hydrargyri Sulphidum Rubrum; U. S.

RED SULPHIDE OF MERCURY.

Hydrargyricum Sulphidum Rubrum—Red Mercuric Sulphide, Red Sulphuret of Mercury, Cinnabar.

A fine scarlet-red powder. Odorless, tasteless, insoluble in water, alcohol, nitric acid, hydrochloric acid, or in dilute solution of potassa or

of soda. When heated it turns brown, then black; on cooling, however, it becomes red again. At a strong heat it ignites, burns with a bluish flame, emits sulphurous fumes, and is finally volatilized without leaving any residue.

Cinnabar in lumps—"brilliant, dark red, crystalline masses"—is not used in pharmacy or medicine.

Medicinal Uses.—Only used in medicine for fumigation. The patient is enclosed in a box, with only his head protruding, and then live coals in a small furnace are placed in the box and cinnabar thrown on them. Fumes of metallic mercury and sulphur are produced and absorbed by the skin. This method is apt to produce salivation or cerebral congestion, and is seldom employed. For a formula for mercurial fumigation see page 564.

Hydrargyrum Ammoniatum; U. S.

Ammoniated Mercury.

White Precipitate, Mercurammonium Chloride.

Dissolve one thousand grams (35 ounces 120 grains) corrosive chloride of mercury, in powder, in twenty liters (about 5 gallons and 2 pints) warm distilled water; filter the solution and allow it to cool. Put fifteen hundred grams (52 ounces 400 grains) water of ammonia into a ten-gallon jar. Now pour the solution of corrosive chloride of mercury, during constant stirring, into the ammonia. It is necessary to see to it that the ammonia is always present in excess; that is, that the whole mixture still has the odor of ammonia after all the mercuric chloride has been added. This is also the reason why the mercury must be added to the ammonia, and not *vice versa*.

Collect the precipitate on a filter, and when the water has drained away as much as practicable, wash it twice with distilled water mixed with one-twentieth of its weight of ammonia, using two liters (4¼ pints) water and one hundred grams (3½ ounces) ammonia water each time. Finally, dry the precipitate between filter paper, in a dark place, at a temperature not above 30° C. (86° F.).

Lack of ammonia at any period of the precipitation and washing, or too great heat in drying, will make the product yellow.

The product obtained by having an excess of mercuric chloride is a different one from that of the new Pharmacopœia. It will contain $NH_2(HgCl)_2.Cl$, instead of $NH_2(Hg).Cl$. The process of the old Pharmacopœia was faulty in that it directed adding the ammonia water to the solution of mercuric chloride, instead of the other way. Yet, when an

excess of ammonia is eventually added, and the precipitate remains in contact with it for some time, the final result will be the same.

Description and Tests.—See the Pharmacopœia, page 180.

Preservation.—Must be kept in well-closed bottles, protected from light.

Medicinal Uses.—Unreliable for internal use, and therefore not employed in that manner. Used externally in ointment in *ophthalmia* and *cutaneous affections.*

HYDRARGYRI AMMONIATI UNGUENTUM; U. S.

OINTMENT OF AMMONIATED MERCURY.

White Precipitate Ointment.

Mix thoroughly ten grams (154 grains) ammoniated mercury and ninety grams (3 ounces 76 grains) benzoinated lard.

Hydrastis; U. S.

HYDRASTIS.

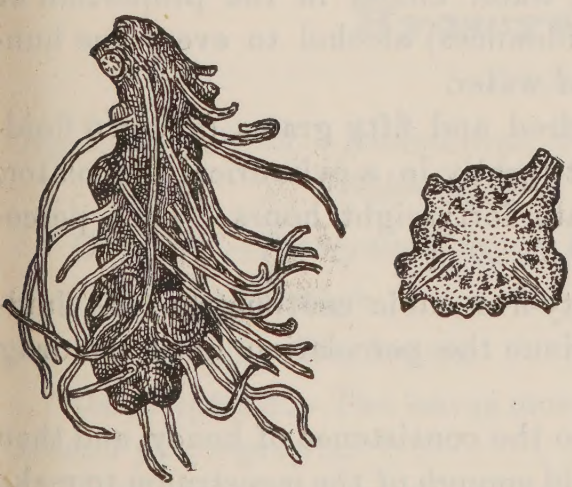
Hydrastis Radix—Golden Seal, Yellow Root, Yellow Puccoon Root.

Origin.—*Hydrastis canadensis*, Linné (*Ranunculaceæ*).

Habitat.—North America.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, pages 181, 182. The rhizomes are rough, usually bent, branched, beset with numerous thin, brittle rootlets. Odor slight but characteristic; taste bitter, slightly astringent.



FIGS. 304, 305.—Hydrastis, with rootlets, natural size, and transverse section, slightly enlarged.

FIG. 306. — Hydrastis, without rootlets, natural size.

Constituents.—Three alkaloids: *berberine*, *hydrastine*, and *xanthopuccine*. *Hydrastine* is in white crystals soluble in alcohol, ether,

chloroform, and benzol, and yields white, bitter salts with acids. Berberine is described under its own title, and xanthopuccine resembles berberine, but gives brown instead of green scales with test-solution of iodine (see Berberine).

Medicinal Uses.—Bitter tonic and stomachic. It has also been recommended in *derangements of the urinary organs* and as a remedy in *dysmenorrhœa* and uterine *hemorrhage.*

Dose.—0.5 to 2 grams (8 to 30 grains), best given in fluid extract.

HYDRASTIS EXTRACTUM.

Extract of Hydrastis.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Yellowish-brown.

Dose.—0.1 to 0.3 gram (2 to 5 grains) three times a day.

HYDRASTIS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Hydrastis.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

An "aqueous fluid extract of hydrastis," also called "fluid hydrastis," etc., is much used. It is made with hot water and glycerin, *without alcohol,* and looks very handsome; but it is not a true *fluid extract,* because the drug cannot be exhausted pint for pound with water and glycerin.

HYDRASTIS TINCTURA; U. S.

TINCTURE OF HYDRASTIS.

Tincture of Golden Seal.

This is made by percolation, one hundred and twenty grams (1850 grains) of the drug, in No. 60 powder, being required for making six hundred grams (or 20 ounces, measuring about 660 cubic centimeters, or 21 fluidounces), the menstruum being diluted alcohol.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

Hyoscyaminæ Sulphas; U. S.

SULPHATE OF HYOSCYAMINE.

This is a neutral sulphate of the alkaloid *hyoscyamine*, and occurs in small yellow or yellowish-white scales or crystals, or in a yellowish-white powder. It is inodorous, but very bitter, acrid. Must be kept in well-corked bottles as it is deliquescent. Soluble in water and in alcohol.

Hyoscyamine is isomeric with atropine.

It is new to the Pharmacopœia, and is a powerful narcotic poison.

The **medicinal properties** are those of hyoscyamus.

Dose.—0.001 to 0.003 gram ($\frac{1}{60}$ to $\frac{1}{20}$ grain), with caution.

Hyoscyamus; U. S.

HYOSCYAMUS.

Hyoscyami Folia—Bilsenkraut, G.; *Jusquiame noir*, F.; *Beleño*, Sp.; *Bolmört*, Sw.; *Henbane Leaves.*

Origin.—*Hyoscyamus niger*, Linné (*Solanaceæ*).

Habitat.—Europe.

Part used.—The leaves.

Description.—The leaves must be collected only from plants of the second year's growth.

They are grayish-green, glandulous, long and soft, hairy; the lower leaves have short stalks, the upper ones have no stalks and partly clasp the stem; they are wrinkled and have a broad whitish midrib, which, in the drug is prominent. Odor heavy, narcotic; taste bitter, acrid.

Annual plants have smaller and much less hairy leaves.

Constituents.—*Hyoscyamine* is the chief constituent. It is an alkaloid, either occurring as an oily liquid, or, after some time, in soft, wart-like, tufted crystals, which have a silky lustre and are either yel-

lowish or colorless. It is soluble in ether, alcohol, and water. When dry and pure it is inodorous. When moist or impure it has a strong, repulsive, suffocating odor, and an acrid taste. It is very poisonous, and, like *atropine*, it causes dilatation of the pupil (see Atropine). With acids it forms crystallizable salts (see Hyoscyaminæ Sulphas).

It is isomeric with atropine.

Medicinal Uses.—Hyoscyamus is an anodyne, narcotic, and hypnotic. In its action it resembles belladonna. It is poisonous in large doses.

Hyoscyamus has been much used to allay *irritation*, *cough*, *spasm*, etc., and is a valuable remedy in such diseases as *asthma*, *neuralgia*, *palpitation of the heart*, and in *mercurial* and *senile trembling*.

It is used to relieve pain, and possesses the advantage over opium, in some cases, that it does not constipate, but rather promotes the action of the bowels ; it is therefore often combined with purgatives, promoting their action while preventing griping.

As an hypnotic it is used when opium is not well tolerated, and in the various forms of *insomnia* accompanying mania, etc.

Externally it is often applied as an anodyne embrocation, usually in the form of oil of hyoscyamus, or the leaves are used with linseed meal in a poultice.

Dose of the leaves, in powder, 0.3 to 2 grams (5 to 30 grains). The average dose is about 0.3 to 0.5 gram (5 to 8 grains), but the drug is seldom given in this form.

The powdered seeds must be given in doses about one-fourth or one-third as large as the leaves.

HYOSCYAMI ABSTRACTUM ; U. S.

Abstract of Hyoscyamus.

Two hundred grams (7 ounces 24 grains) of hyoscyamus leaves, in No. 60 powder, is moistened uniformly (by rubbing between the hands) with eighty grams (8⅓ fluidounces) of ninety-four per cent. alcohol. The moist powder is packed tightly in a tall cylindrical percolator. More alcohol is now added until the mass is saturated and the liquid begins to drop at the lower end of the percolator, while a layer of the alcohol still covers the upper surface of the drug. The exit of the percolator is now closed and the top covered to prevent evaporation. The whole is allowed to stand forty-eight hours. Then the percolation is started, adding alcohol as required to keep the drug always covered. When one hundred and seventy grams (6 fluidounces) of the percolate has been obtained, set that portion aside. Place another receiver under the per-

colator and continue the process until the drug is exhausted. Evaporate this second percolate down until it weighs thirty grams (or measures 1 fluidounce). Mix this with the reserved portion. The mixed liquids (weighing together two hundred grams) are put in a tared evaporating dish with fifty grams (1 ounce 330 grains) of powdered milk sugar, and set in a place where the temperature is between 40° and 50° C., or from 104° to 122° F., until the mixture is dry. Then enough powdered sugar of milk is added to make the total weight of the contents of the dish one hundred grams (3 ounces 230 grains). The whole is now triturated until a uniform and very fine powder is obtained.

The same product may be obtained by evaporating one thousand cubic centimeters of the fluid extract of hyoscyamus leaves with the requisite quantity of milk sugar, making five hundred grams finished product.

[Two avoirdupois pounds of powdered hyoscyamus leaves will yield one pound of abstract. This will require one-half pint alcohol for moistening, and about half a pint more for saturating the drug preparatory to the forty-eight hours' maceration. The reserved portion will measure about two pints, and the second percolate, after evaporation to the prescribed point, will measure nearly six fluidounces.]

The **dose** is about six to twenty centigrams (1 to 3 grains).

HYOSCYAMI CATAPLASMA.

Henbane Poultice.

Coarsely powdered henbane leaf, sixty grams (2 ounces) ; flaxseed meal, one hundred and eighty grams (6 ounces) ; boiling water, six hundred cubic centimeters (20 fluidounces). Mix the powders and stir them gradually into the water.

Or half a fluidounce of fluid extract of henbane may be added to eight to ten ounces of flaxseed poultice.

Used to relieve the *pain of sores* and *swellings*.

HYOSCYAMI EXTRACTUM ; U. S. 1870.

Fresh hyoscyamus leaves are sprinkled with water and bruised in a stone mortar. The juice is then expressed, heated to boiling, strained, and finally evaporated to extract.

Brown. Yield about four per cent. As usually found in the shops it is extremely unreliable, varying greatly in strength.

Dose.—From 0.10 gram (2 grains) upward, until the proper effects are obtained.

HYOSCYAMI EXTRACTUM ALCOHOLICUM; U. S.

Alcoholic Extract of Hyoscyamus [Leaves].

From five hundred grams (17⅔ avoirdupois ounces) of hyoscyamus leaves, recently dried, and in No. 60 powder.

As a *first menstruum* use a mixture of one thousand grams (41¾ fluidounces) alcohol and five hundred grams (17 fluidounces) water. As a *second* menstruum use a sufficient quantity of diluted alcohol. Moisten the drug with two hundred grams (about 8 fluidounces) of the first menstruum. Pack tightly in a cylindrical percolator. Saturate it with menstruum. Macerate twenty-four hours. Then percolate. Reserve four hundred and fifty grams (about 15 fluidounces) of *first percolate.* Continue the percolation until the drug is exhausted, or until one thousand and fifty grams (about 38 to 40 fluidounces) of *second percolate* has been obtained. Evaporate the *second percolate* to a soft extract and dissolve this in the *first percolate.* Evaporate the mixture to a pilular consistence.

No glycerin is added to this extract.

Yield about sixteen per cent. The extract is dark brownish-green.

Dose.—0.05 to 0.15 gram (1 to 2¼ grains).

HYOSCYAMI EXTRACTUM [FOLIORUM] FLUIDUM; U. S.

Fluid Extract of Hyoscyamus [Leaves].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 8 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.3 to 2 cubic centimeters (5 to 30 minims).

HYOSCYAMI OLEUM INFUSUM.

INFUSED OIL OF HYOSCYAMUS.

Beat one thousand grams (35 ounces 120 grains) fresh henbane leaves with a little cotton-seed oil until reduced to a pulpy mass. Then add two thousand grams (70 ounces 240 grains) cotton-seed oil, and heat the mixture on a water-bath until all the moisture has evaporated. Strain, express, and filter.

In the absence of fresh hyoscyamus leaves this preparation may be made by macerating two hundred grams (7 ounces 24 grains) dried hyoscyamus leaves, cut, with four hundred and seventy-five cubic centimeters (16 fluidounces) alcohol in a closed vessel for twelve hours, then adding one thousand grams (35 ounces 120 grains) cotton-seed oil, and heating the whole together in a porcelain evaporating dish on a water-bath until the alcohol has evaporated and the leaves appear as if dry. Then express and filter.

Should be kept in a dark place.

Used for external application.

HYOSCYAMI SUCCUS.

INSPISSATED JUICE OF HYOSCYAMUS.

Bruise a convenient quantity of fresh leaves and young branches of hyoscyamus in a stone mortar ; press out the juice ; add to the latter one-third of its volume of rectified spirit. Set it aside seven days. Then filter. Keep the product in a cool place.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

HYOSCYAMI [FOLIORUM] TINCTURA ; U. S.

TINCTURE OF HYOSCYAMUS [LEAVES].

The Pharmacopœia prescribes that three hundred grams (about $10\frac{1}{2}$ fluidounces) tincture be made from forty-five grams (1 ounce 260 grains) recently dried hyoscyamus leaves, in No. 60 powder, using diluted alcohol as a menstruum, and percolating the moistened and firmly packed drug in a cylindrical percolator.

Dose.—One to eight cubic centimeters ($\frac{1}{4}$ to 2 fluidrachms).

Hyoscyami Radix.

HYOSCYAMUS ROOT.

Origin.—*Hyoscyamus niger*, Linné (*Solanaceæ*).

Description.—Carrot-shaped, seldom or scarcely branched, fifteen

to twenty-five millimeters ($\frac{3}{4}$ to 1 inch) thick, with numerous rootlets; externally brown, wrinkled; internally dirty whitish; bark thick, spongy, porous; wood-ring narrow, dense; pith large, spongy.

Constituents.—Hyoscyamine.

Medicinal Uses.—It has been stated to possess more active properties than the other parts of the plant, but is seldom used in this country.

HYOSCYAMI RADICIS TINCTURA.

TINCTURE OF HYOSCYAMUS ROOT.

Percolate ninety grams (or 3 ounces) dried hyoscyamus root, in No. 60 powder, with diluted alcohol, to obtain six hundred cubic centimeters (20 fluidounces) tincture.

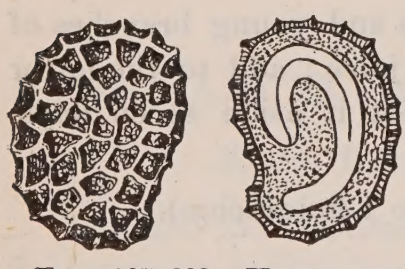
Dose.—One to three cubic centimeters (15 to 45 minims).

Hyoscyami Semen.

HYOSCYAMUS SEED.

Henbane Seed.

Flattish, round, nearly kidney-shaped, one to one and one-half millimeter ($\frac{1}{25}$ to $\frac{1}{16}$ inch) long, externally gray or yellowish-gray, pitted; grayish-white within. The embryo is curved. Inodorous; taste oily, bitter, acrid.



FIGS. 307, 308.—Hyoscyamus Seed, whole, and longitudinal section, enlarged.

Constituents.—The alkaloid *hyoscyamine* is found in the henbane seeds in larger quantities than in the leaves. The seeds also contain about twenty-four per cent. fixed oil.

An amorphous, yellowish, bitter glucoside called *hyoscypicrin*, soluble in water and in alcohol, has also been found.

The seeds are said to be three or four times as strong as the leaves, and the dose must be lessened accordingly.

Dose.—0.25 to 1 gram (4 to 15 grains).

HYOSCYAMI SEMINIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HYOSCYAMUS SEED.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.20 to 1 cubic centimeter (3 to 15 minims).

HYOSCYAMI SEMINIS TINCTURA.

TINCTURE OF HYOSCYAMUS SEED.

Prepared by percolating ninety grams (or 3 ounces) hyoscyamus eed, in No. 40 powder, with diluted alcohol to obtain six hundred cubic entimeters (20 fluidounces) tincture.

Dose.—One to three cubic centimeters (15 to 45 minims).

Hypophosphites.

HYPOPHOSPHITES.

The compound preparations of the hypophosphites of calcium, odium, potassium, and iron are extensively employed for medicinal urposes. As they do not properly belong under the title of any single ne of their ingredients, we insert these preparations here as a class.

Medicinal Uses.—The preparations containing hypophosphites re supposed to be of value in diseases accompanied with a deficiency f lime salts and phosphorus in the system, as in *anæmia*, *caries*, *ickets*, *consumption*, etc.

HYPOPHOSPHITIS CALCII SYRUPUS.

SYRUP OF HYPOPHOSPHITE OF CALCIUM.

See Calcii Hypophosphis.

HYPOPHOSPHITUM CALCII ET SODII SYRUPUS.

YRUP OF THE HYPOPHOSPHITES OF CALCIUM AND SODIUM ("LIME AND SODA").

Dissolve twenty-six grams (400 grains) hypophosphite of calcium nd the same quantity of hyposulphite of sodium in three hundred and ixty cubic centimeters (12 fluidounces) water ; add six hundred grams 21 ounces) sugar, and enough water to make the syrup measure nine undred and seventy cubic centimeters, to which add thirty cubic centi- neters (1 fluidounce) orange-flower water, the whole product thus being nade to measure one liter (34 fluidounces).

Each teaspoonful contains two grains each of the hypophosphites f calcium and sodium.

Dose.—One teaspoonful.

HYPOPHOSPHITUM SYRUPUS; U. S.

SYRUP OF HYPOPHOSPHITES.

Calcii, Sodii et Potassii Hypophosphitum Syrupus—Compound Syrup of the Hypophosphites; Churchill's Syrup.

Dissolve thirty-five grams (1 ounce 103 grains) hypophosphite of calcium, twelve grams (185 grains) hypophosphite of sodium, and twelve grams (185 grains) hypophosphite of potassium, by trituration, in three hundred and fifty cubic centimeters (about 12 fluidounces) water, using if necessary not more than one gram (15 grains) citric acid to dissolve any undissolved residue. Add two grams (30 grains, or about 40 minims) spirit of lemon. Filter the whole through paper, and add through the filter sufficient water to make the whole weigh five hundred grams (17⅔ avoirdupois ounces). Dissolve in the filtrate five hundred grams (17⅔ ounces) sugar, without the use of heat, and strain.

The product measures about eight hundred cubic centimeters (27 fluidounces), and each teaspoonful contains about three grains hypophosphite of calcium, and one grain each of the hypophosphites of sodium and potassium.

Dose.—One teaspoonful.

HYPOPHOSPHITUM GLYCERITUM.

GLYCEROLE OF THE HYPOPHOSPHITES.

This is simply the syrup of hypophosphites with glycerin substituted for the sugar and most of the water.

Dose.—One teaspoonful.

HYPOPHOSPHITUM SYRUPUS CUM FERRO; U. S.

SYRUP OF HYPOPHOSPHITES WITH IRON.

Compound Syrup of the Hypophosphites with Iron; Syrup of the Hypophosphites of Lime, Soda, Potassa, and Iron.

Dissolve ten grams (154 grains) lactate of iron by the aid of trituration in nine hundred and ninety grams (34 ounces 400 grains) syrup of hypophosphites, gradually added. Each teaspoonful contains about three grains hypophosphite of calcium, one grain each of the hypophosphites of sodium and potassium, and one grain lactate of iron.

Dose.—One teaspoonful.

HYPOPHOSPHITIS FERRI SYRUPUS.

SYRUP OF HYPOPHOSPHITE OF IRON.

See Ferri Hypophosphis.

Hyssopus.

HYSSOP.

Hyssopi Herba—*Ysop*, G.; *Hysope*, F.; *Hisopo*, Sp.; *Isop*, Sw.

Origin.—*Hyssopus officinalis*, Linné (*Labiatæ*).

Habitat.—Cultivated.

Part used.—The flowering plant.

Description.—Stem wand-like; flowers purple; the opposite, lanceolate, sessile leaves have oil-glands on the under surface; their upper surface is finely wrinkled. Aromatic, pungent, bitter, camphor-like.

Constituents.—About one-half to one per cent. volatile oil and some tannin and bitter extractive.

Medicinal Uses.—Stimulant, carminative, sudorific.

Dose.—Two to five grams (30 to 75 grains) in infusion or fluid extract.

HYSSOPI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF HYSSOP.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Ichthyocolla; U. S.

ISINGLASS.

Colla Piscium—*Hausenblase*, *Fischleim*, G.; *Colle de poisson*, *Ichthyocolle*, F.; *Ictiocola*, *Cola de Pescado*, Sp.; *Husblås*, Sw.

Origin.—*Acipenser Huso*, Linné; and other fishes.

Description.—The inner membrane of the swimming-bladder. It is dried either spread out, folded in various ways, or rolled, or cut, and we accordingly have *leaf*, *book*, and other forms of isinglass.

Leaf isinglass is in flat sheets. It is the kind most used.

Russian isinglass is the kind most valued. A good article is colorless, semi-transparent, tough, free from odor and taste, and soluble almost without residue in boiling water.

Shred isinglass is convenient for making solutions rapidly. It is slightly yellowish, and in translucent threads.

American isinglass is very inferior, leaving an undissolved residue of from eighteen to thirty per cent.

Purse or *pipe isinglass* is also an inferior grade, consisting of fish sounds dried whole.

The chief constituent of isinglass is *glutin*, of which a good drug contains seventy per cent.

A transparent jelly is obtained by boiling isinglass in twenty-four times its weight of water and allowing the solution to cool.

Isinglass (or fish-glue) is practically a very different thing from *gelatin* (from calves' pelt, etc.). Gelatin is, however, commonly, though erroneously, called isinglass too, and thus the two things are often confounded, the more readily so as they closely resemble each other chemically. They may be distinguished by the following differences:

Isinglass.	Gelatin.
Semi-transparent.	Quite transparent, or quite opaque and whitish from minute air-bubbles.
Membranous and tearing with great difficulty except in the direction of its fibres.	Devoid of structure.
Swells and becomes quite opaque, but does not dissolve in cold water.	Dissolves, making a clear solution with cold water.

Isinglass is an important constituent in many *cements*, for which purposes *gelatin* is useless.

Medicinal Uses.—Isinglass is much used for clarifying liquids. Internally it is used as a nutrient lenitive in *bowel complaints*. For this purpose it is dissolved in milk and given *ad libitum*. Externally it is employed as a protective.

Isinglass coating for making adhesive

ISINGLASS PLASTER (Squire).

Soak ten grams (154 grains) isinglass in an emulsion of five grams (77 grains) ammoniac and eighty grams ($2\frac{2}{3}$ ounces) water. Then put the mixture on a water-bath and heat until the isinglass is liquefied. Finally add, gradually, twenty grams (308 grains) tincture of ammoniac made from 1.25 gram (20 grains) ammoniac to twenty grams (about 400 minims) of proof spirit.

This mixture is to be spread thinly (while hot so as to be liquid) on silk or taffeta or on court-plaster. Mr. Squire states that it "answers perfectly."

ICHTHYOCOLLÆ EMPLASTRUM; U. S.

ISINGLASS PLASTER.

Court Plaster.

Dissolve thirty grams (1 ounce) isinglass in three hundred and thirty grams (11 ounces) hot water. Paint one-half of this in successive layers on silk taffeta stretched on a level surface, waiting after each application until the previous layer is dry. Mix the remaining half of the isinglass solution with one hundred and twenty grams (4 ounces, or about $4\frac{3}{4}$ fluidounces) alcohol and three grams ($\frac{1}{10}$ ounce) glycerin, and then apply this mixture in the same manner. Then varnish the back of the taffeta with tincture of benzoin and let dry.

It will require one grain isinglass to cover each square inch of surface. Thus the above quantities will cover sixteen by thirty inches.

Uses.—As a protective, and to hold the edges of slight wounds together. This plaster cannot be used when moist applications must be made. Clean wounds, when they have stopped bleeding, may be closed with isinglass plaster and collodion applied over it, when healing by first intention often takes place.

This plaster is often spread on black taffeta, and then forms the black isinglass plaster which is much used for "beauty spots," to make a fine skin appear still more delicate and white by contrast with the black spot, or to call attention to some feature, as a pretty dimple, etc.

Ignatia; U. S.

IGNATIA.

St. Ignatius' Bean, E.; *Ignazbohnen*, G.; *Fève de Saint Ignace, Fève Igasurique*, F.

Origin.—*Strychnos Ignatii*, Bergius (*Loganiaceæ*).

Habitat.—Philippine Islands.

Part used.—The seeds.

Description.—Irregularly eggshaped, angular, about thirty millimeters ($1\frac{1}{5}$ inch) long, brownish, horny, somewhat translucent, extremely hard; fracture granular; light brownish within, showing a cavity containing the embryo. Odor none; taste intensely bitter.

Constituents.—The only important constituents are from one-half to one and one-half per cent. *strychnine*, and nearly the same quantity of *brucine*—both alkaloids, and both highly poisonous.

Medicinal Uses.—Similar to those of nux vomica, but stronger. It is employed almost exclusively for the preparation of strychnine.

Dose.—0.05 to 0.1 gram (1 to 2 grains) in powder.

IGNATIÆ ABSTRACTUM; U. S.

ABSTRACT OF IGNATIA.

Preparation.—See the Pharmacopœia. One thousand grams (35 ounces 120 grains) ignatia, in fine powder, will give five hundred grams (17 ounces 280 grains) abstract. This will require about two hundred and forty cubic centimeters (8 fluidounces) alcohol and sixty cubic centimeters (2 fluidounces) water for moistening, and nearly as much more for saturating the drug preparatory to the forty-eight hours' maceration. The reserved portion will measure about one thousand cubic centimeters (34 fluidounces), and the second percolate will, after evaporation as directed, measure nearly one hundred and eighty cubic centimeters (6 fluidounces).

The same product will be obtained by taking the fluid extract of ignatia, adding one-fourth its weight of powdered sugar of milk, and evaporating spontaneously to dryness, and then making up the required total weight with more powdered sugar of milk, after which the product is to be finished by powdering in the usual way.

Dose.—About three to six centigrams ($\frac{1}{2}$ to 1 grain).

IGNATIÆ EXTRACTUM.

EXTRACT OF IGNATIA.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brown. Yield about ten per cent.

Dose.—0.015 to 0.03 gram ($\frac{1}{4}$ to $\frac{1}{2}$ grain), three times daily, to be cautiously increased.

IGNATIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF IGNATIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.2 cubic centimeter (1 to 3 minims).

IGNATIÆ TINCTURA; U. S.

TINCTURE OF IGNATIA.

Mix alcohol and water in the proportion of eight parts by weight (or 10 parts by measure) of alcohol to each part of water.

Moisten any convenient quantity of ignatia, in No. 60 powder, with its own weight of the above menstruum, and macerate twenty-four hours. Then pack it tightly in a cylindrical percolator and exhaust the drug with the same menstruum as before used. Reserve of the first percolate as much as nine times the weight of the drug used. Evaporate the second percolate to the weight of the drug used, and mix that with the first percolate.

Now ascertain how much dry extract is contained in the tincture by evaporating to dryness a convenient sample. Then dilute the whole tincture so that there shall be one per cent. dry extract in the whole product.

The object of prescribing that the amount of dry extract shall be ascertained and adjusted is to insure a uniform product, which would otherwise not generally be obtained, as the exhaustion of the drug will be more or less incomplete unless carefully conducted.

Good ignatia yields more than ten per cent. dry extract ; but as standardized by the official formula the uniformity of the product is insured, and the finished tincture represents one-tenth its weight of ignatia of fair quality.

Dose.—One to four cubic centimeters (15 to 60 minims).

Illicium ; U. S.

ILLICIUM.

Illicii Fructus, Anisum Stellatum—Sternanis, G.; *Badiane, Anise étoilé*, F.; *Stjernanis*, Sw.; *Star Anise.*

Origin.—*Illicium anisatum*, Loureiro (*Magnoliaceæ*).

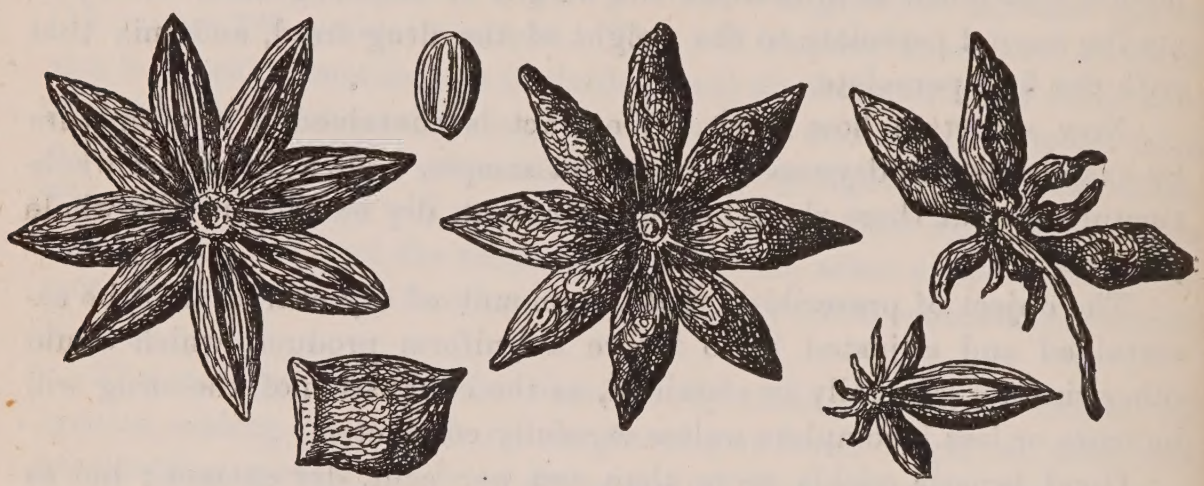
Habitat.—China, Siam.

Part used.—The fruit.

Description.—As seen in the illustrations, it consists of generally eight carpels arranged in a star-shaped whorl around a central axis, which is the continuation of the stalk. Generally some of the carpels are aborted, and the drug is often much broken. The carpels are brown, have straight points, and are open at the upper suture exposing the seeds. The seeds are flat, oval, shining, brown. Odor like that of anise ; taste sweetish, aromatic.

Constituents.—Star anise contains a volatile oil which is chemically identical, and practically almost identical, with the volatile oil of anise. The carpels contain over five per cent., and the seeds nearly two per cent. of that volatile oil. Besides, there is nearly three per cent. fixed oil in the carpels, and about twenty per cent. in the seeds.

Adulterations.—The fruit of *Illicium religiosum*, Siebold, shown by the illustrations, resembles the star anise, and has been substituted for it. *Illicium religiosum* is said to be poisonous. The carpels of this fruit are more rough, shrivelled, and wrinkled, and have a beak which is



FIGS. 309–314.—Illicium anisatum, upper and lower surface, of completely and partially developed clusters of carpels, single carpel and seed; all natural size.

bent upward. The odor is faintly aromatic, clove-like, and the taste disagreeable, somewhat saline, and cardamom-like. The fruit is smaller than that of star anise, and in bulk it has the appearance of being lighter in color, the carpels being more opened so as to expose the lighter-colored interior.

The constituents of the fruit of *Illicium religiosum* (called *shikimi* fruit in Japan where it is cultivated) are less than one-half per cent.

FIGS. 315–322.—Illicium religiosum, ripe but undried fruit, whole and partially developed clusters of carpels, single carpels and seed; all natural size.

volatile oil, heavier than water, and a crystalline substance called *sikimin*, soluble in water, alcohol, ether, chloroform, and in glacial acetic acid.

Medicinal Uses.—Similar to those of anise; stimulant, carmina-

tive, and stomachic. It also enjoys much confidence as a remedy in *chronic bronchitis*, and is an ingredient of many of the popular pectoral teas.

Dose.—0.5 to 2 grams (8 to 30 grains).

Imperatoria.

IMPERATORIA.

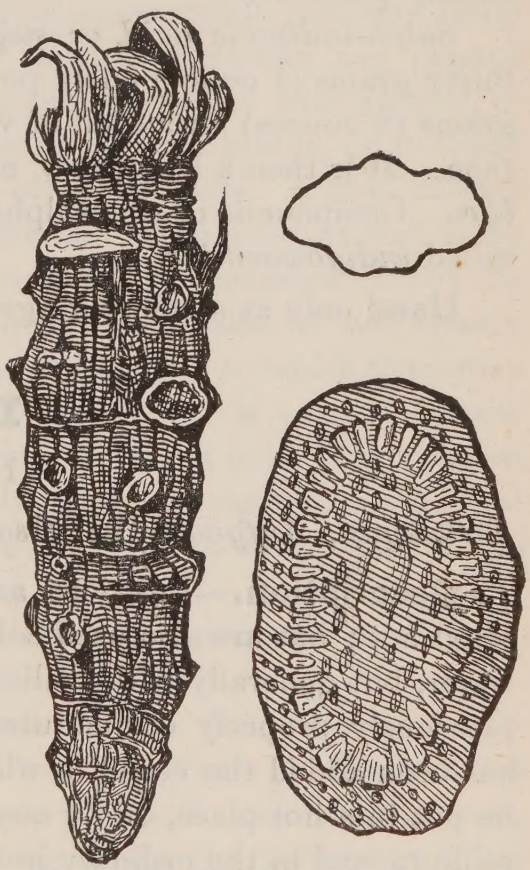
Imperatoriæ Radix—Masterwort Root.

Origin.—*Imperatoria ostruthium*, Linné (*Umbelliferæ*).

Habitat.—Europe and North America.

Part used.—The rhizome.

Description.—Knotty, flattened, marked by transverse rings and longitudinal wrinkles, externally blackish-gray or grayish-brown, with scars from the rootlets, brownish-yellow in the interior, showing numerous resin-ducts in the bark and pith, but none in the thin wood. Odor aromatic; taste pungent, bitter. The root bears some resemblance to aconite, and has been found as an adulterant of that drug.



FIGS. 323–325.—Imperatoria, natural size. Outline of transverse section of dry rootstock, natural size, and enlarged section of rootstock soaked in water.

Constituents.—From one-fifth to three-fourths per cent. of *volatile oil* of a camphoraceous taste. Also *resin*, and a neutral crystalline principle called *imperatorin* (*peucedanin*), which is odorless and insoluble in water, but soluble in alcohol, yielding a solution of pungent taste. Resembles angelica.

Medicinal Uses.—Aromatic stimulant in *atonic dyspepsia, flatulence, colic*, etc. Seldom used.

Dose.—One to two grams (15 to 30 grains) in infusion.

Indigo.

INDIGO.

Origin.—Several species of *Indigofera*, Linné (*Leguminosæ*).

Habitat.—India.

Description.—A blue coloring matter prepared from the juice of the plants by treating the green twigs and leaves with a kind of fermentation process. Indigo occurs in more or less firm, brittle masses of a blue to a purplish color. Inodorous and tasteless. Good indigo is dry, light, floating on water, and gives a coppery streak when scratched. Insoluble in water or in alcohol.

Varieties.—Bengal, Guatemala, Caracas, Madras, and Manila are all found in our market, and are valued in the order as here named. The trade designation "Spanish Float" Indigo is sometimes given to a very light friable indigo, which is considered superior.

Constituents.—Should contain from seventy to ninety per cent. of *indigo-blue* or *indigotin.* Poor grades contain from fifty down to twenty per cent.

Sulph-indigotic acid, or *sulphate of indigo,* is made by dissolving thirty grams (1 ounce) finely powdered indigo in two hundred and forty grams (8 ounces) strong oil of vitriol, which requires two or three days' time. It is then a blue pasty mass, miscible with water, forming *liquid blue.* Compounds of this sulph-indigotic acid with soda and potassa are called *indigo-carmine.*

Used only as a coloring agent and chemical test-solution.

Infusa.

INFUSIONS.

Infusionen, Aufgüsse, G.; *Tisanes,* F.; *Infusion,* Sp.; *Infusioner,* Sw.

Description.—Infusions are teas. They are frequently administered hot; but are also used cold. Sometimes they are made with cold water, but generally with boiling water, which is poured upon the drug previously properly comminuted or bruised. After the boiling water has been added the vessel in which the infusion is being made must not be put in a hot place, or by any means kept hot; it is simply to be set aside to cool in the ordinary house temperature.

The drugs from which infusions are preferably made are those of a loose texture and containing substances which will be taken up by the water, but which would be injured or expelled by boiling. Diaphoretic, diuretic, anthelmintic, and laxative or cathartic teas and draughts, and demulcent drinks, are the most common infusions. Purely bitter stomachic tonics are also frequently presented in the form of infusions, as, for instance, quassia, and occasionally astringents.

When a physician prescribes an *infusion* it would seem that there can be no room for doubt as to his meaning. Yet the improper prac-

tice prevails to a considerable extent of substituting fluid extracts mixed with water when infusions are ordered. Physicians are probably not aware of the extent to which this practice is carried. It is encouraged by many manufacturers of fluid extracts, who publish on every bottle formulæ for preparing infusions, decoctions, etc., from the fluid extracts.

There is but one way to properly prepare an infusion, and that is to make it freshly when wanted for use, and to make it from the crude drug with water. It is not proper even to prepare *concentrated infusions* and keep these on hand for dispensing purposes, preserved by alcohol, salicylic acid, or other agents. The number of infusions that can even for a brief period of time be kept on hand without change or injury is extremely limited. A mixture of a fluid extract, or a tincture, or a "concentrated infusion," with water, is an essentially different thing from a freshly prepared tea (infusion). Neither physician nor patient would be satisfied with an old tea, or one preserved with alcohol, or salicylic acid. Many physicians prize infusion of digitalis, or infusion of buchu, above any other preparations of these drugs. A fluid extract or a tincture is prepared with a very different menstruum, as well as by a radically different process; and a concentrated infusion cannot, by any means, be preserved so as to retain the properties of the freshly made infusion, and least of all by adding substances to which there may frequently be serious therapeutical objections. If it is proper to insist upon nice tests of purity in chemicals, and we think it is, then consistency demands that we should be equally careful in regard to galenical preparations. It is never safe, and always wrong, to suppose that one thing will answer when another has been prescribed.

Preparation.—The general directions for the preparation of infusions in the new Pharmacopœia are as follows:

Put thirty grams (1 avoirdupois ounce) of the drug, coarsely comminuted or bruised, together with three hundred grams (10 fluidounces) of boiling water into a suitable vessel provided with a well-fitting cover, and let it stand for two hours, after which strain the infusion, adding enough boiling water through the strainer to make the final product weigh three hundred grams (or measure 10 fluidounces).

Two hours' maceration is in most cases altogether unnecessary, and in some instances quite objectionable. It is rarely, if ever, intended that an infusion shall contain everything that can be dissolved out of the drug by hot water. One-half hour is amply sufficient as a general rule.

Squire's infusion pot (see Fig. 326) is the best vessel to use for making infusions. The advantage it possesses is that it is a perfect displacement apparatus. The prepared drug is placed in the perforated

strainer fitted into the top of the mug ; enough water is then added so that its level stands above the drug, the quantity made being just what the infusion pot accommodates properly ; the whole apparatus is covered and set aside the prescribed period, after which the infusion is poured off at the spout, and will require no straining if the drug used was free from powder or particles small enough to pass through the

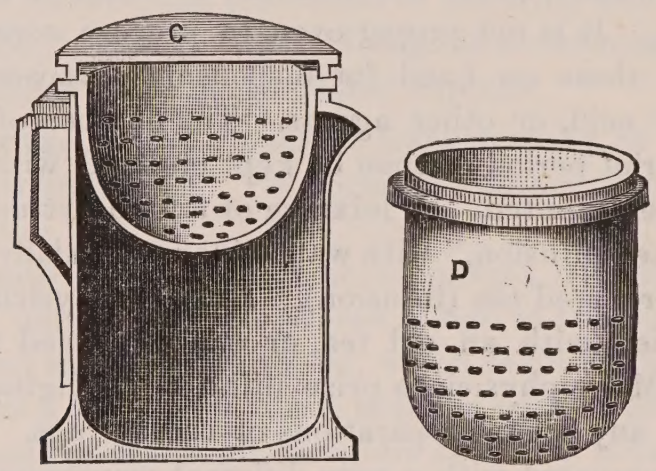


FIG. 326.—Squire's Infusion Pot. *C*, lid ; *D*, inner vessel to contain the drug.

perforations. In the absence of Squire's infusion pot an ordinary flat-topped white jar will answer.

The Strength of Infusions.—The new Pharmacopœia contains only five infusions, as against thirty-one in the Pharmacopœia of 1870. Two of the five infusions now official, viz., Infusum Brayeræ and Infusum Sennæ Compositum, were not in the former Pharmacopœia. The other three—those of Cinchona, Digitalis, and Wild Cherry—are nearly the same strength as the same infusions of 1870. Of the thirty-one infusions in the Pharmacopœia of 1870, one—the Infusion of Tar—was made of one ounce to four ounces of water ; one—Infusion of Taraxacum—was made from one ounce drug to seven and one-half ounces finished product ; eleven were made of one to fifteen ; eleven were made of one to thirty ; one was one to forty ; two were one to sixty ; one was one to sixty-eight ; and one was one to one hundred and twenty parts. It will thus be seen that the strength of different infusions varies greatly. Other infusions are used which are made of strengths differing from either or all of these. This is not mere accident. The proportions to be used depend chiefly upon the character of the drug, the facility with which it is exhausted, the taste of the resulting infusion, and the purposes for which it is to be used. The fact that no general rule, no uniform proportional strength can be applied is proven by the five official exceptions to the official rule. It is clear, therefore, that the official general rule as to strength of infusions is not only useless but may cause

embarrassment and confusion. The rule is that "an ordinary infusion, the strength of which is not directed by the physician nor specified by the Pharmacopœia, shall be prepared" so that one hundred parts of the finished preparation represent ten parts of the drug. A "caution" is appended suggesting that "the strength of infusions of energetic or powerful substances should be specially prescribed by the physician." It would have been better to say at once that whenever an infusion is prescribed which is not official the physician should specify its strength in each case. The fact is, that physicians very frequently prescribe infusions without specifying the strength, whether the infusions prescribed are official or not, and without reference to whether they are "ordinary infusions" or "infusions of energetic or powerful substances." Aside from the fact that a uniform interpretation of the terms "ordinary" and "energetic or powerful" in this case would be hopeless, we believe that even the most ordinary infusions cannot well be made uniformly of one ounce drug to ten fluidounces product. Infusion of quassia will hardly be looked upon otherwise than as an ordinary infusion, and it is certainly not energetic or powerful in the sense intended by the Pharmacopœia; but if a physician prescribes infusion of quassia without specifying the strength, we would make it one to sixty, as in the old Pharmacopœia, rather than to risk making it six times that strength under the general rule, not because any harm could possibly result to the patient, but because we are sure few, if any, physicians would want to give a ten per cent. infusion of quassia. The same remarks would apply to infusion of capsicum and infusion of cloves. On the whole the rule should not have been made. We recommend to the pharmacist to refer to the "Companion" in all cases where any doubt exists, unless he can consult the writer of the prescription.

Infusions made by Percolation.—Infusion of cinchona and infusion of wild cherry are made by cold percolation.

Inhalationes.

Inhalations.

Inhalations are used for the treatment of affections of the broncho-pulmonary mucous membranes. Chloroform, ether, nitrous oxide, and other anæsthetics are given in this manner. Some solid substances, as iodine and iodoform, may be converted into vapor by heat and inhaled. But the most frequent method of administering medicines by inhalation is by means of the steam spray apparatus or atomizer. In Fig. 327 we illustrate an apparatus of this kind. It consists of a boiler

to contain water, which can be converted into steam by means of a small alcohol lamp. From this boiler a tube passes out horizontally, through which the steam is blown at right angles over the fine opening of another but perpendicular tube, the lower end of which dips into a small cup containing a watery solution of the medicine. As the steam is blown over the mouth of this tube a vacuum is produced, and the liquid rises until a drop issues from the upper end of the tube, when it is blown away and pulverized or converted into fine spray by the force of the steam jet. To prevent the spray from being blown all over the face of the patient a mouth-piece or shield is provided.

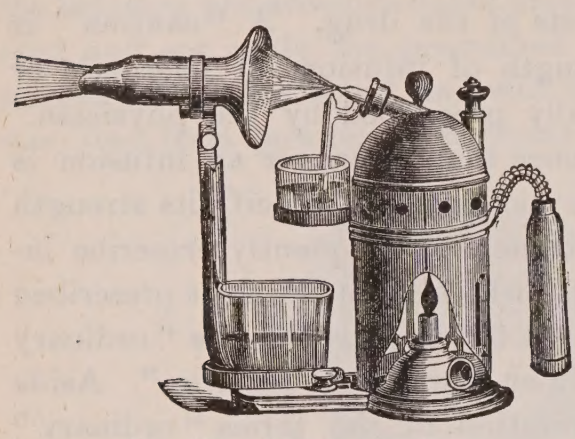


FIG. 327.—Steam Atomizer.

Or instead of steam a hand atomizer (Fig. 328) may be employed,

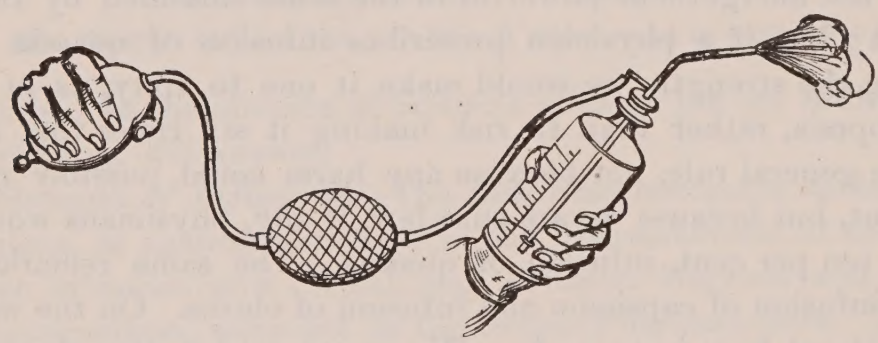


FIG. 328.—Hand Atomizer.

which consists of a rubber bulb, by the compression of which a jet of air is made to take the place of the steam jet used in the steam inhaler. By inserting a second elastic bulb between the first bulb and the nozzle a continuous jet of air and spray may be projected.

By using suitable nozzles the spray may be blown into the anterior or posterior nares, the pharynx, or glottis, etc.

FIG. 329.—Inhaler.

Warm water, salt water, anodyne solutions, as of opium, cannabis indica, bitter almond water, belladonna, etc.; astringent solutions, as of tannic acid or of the iron preparations ; alterative solutions, as of chloride of ammonium, nitrate

of silver, etc.; or antiseptic solutions, as of creosote, tar, carbolic, boric, or salicylic acids, may be employed in this manner.

The simplest form of inhaling apparatus (Fig. 329) is one consisting of a bottle with a cork through which two tubes are passed, one of which dips to near the bottom of the liquid contained in the bottle, while the other only passes through the cork. To the latter is attached a tube with mouthpiece. This apparatus may easily and cheaply be improvised. The medicines which can be used in this apparatus are such as may be converted into a vapor by being mixed with warm water.

The smoking of stramonium leaves, or of paper saturated with nitre, in asthma, is also a form of inhalation.

INSUFFLATION

differs but little from inhalation, except that the medicines are in the form of powder instead of in the form of spray; and the blowing or dusting of iodoform or boric acid upon wounds or into abscesses, etc., is similar to insufflation.

Injectiones.

Injections.

Injections consist in the introduction of fluid or semifluid substances into various natural or pathological cavities or canals of the body by means of a syringe.

When made into the rectum they are termed *enemata*, and are described under that title in this book.

Different forms of apparatus are employed for injections, one of the most useful being the fountain syringe, consisting of a vessel, to the bottom of which a rubber tube, with appropriate nozzle, is connected, and when this vessel is elevated the pressure of the column of fluid forces the latter into the cavity to be injected. By elevating or lowering the vessel, greater or less pressure may be exercised as desired. All air should be allowed to escape from the tube before the nozzle is introduced.

The old-fashioned piston syringes, requiring the assistance of an attendant for rectal or vaginal injections, have gone entirely out of use.

Injections are frequently made into the urethra or bladder for the purpose of washing out these organs or to apply local medications. Injections into the bladder are best made through a double catheter (Fig. 330), one arm of the catheter being connected to the rubber tube of a

fountain syringe, and when all air is expelled from the tube and catheter the latter is introduced into the bladder and the current of fluid allowed to run. The bladder will then be washed out thoroughly, the water or medicated fluid escaping through the other arm of the catheter.

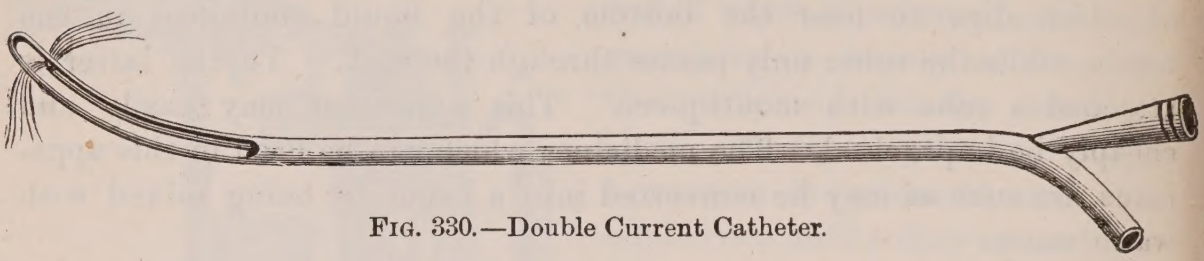


FIG. 330.—Double Current Catheter.

By refilling the vessel, as its contents run out, any desirable quantity of fluid may be caused to flow through the bladder.

Vaginal injections are made in the same manner, with the exception that a vaginal nozzle is used instead of the double catheter, and the patient sits over a bucket or chamber vessel and allows the fluid to escape through the vagina itself. The vaginal nozzle is usually provided with an opening at the end, but as some of the fluid may be thrown through this opening into the cavity of the uterus when it may give rise to uterine colic or inflammation, it is better to obtain such nozzles as are only provided with lateral openings.

A *bulb syringe*, in which the fluid is forced into the vaginal cavity by the compression of a rubber bulb, is used for the same purpose, but tires the patient too much. By having a second bulb between the suction or force bulb and the nozzle, a steady stream of fluid may be thrown.

Urethral injections (male) are best made with a syringe having a conical end and not a long nozzle. By pressing the end of such a syringe into the orifice of the urethra, the latter may be tightly closed and the fluid forced into the urethra, distending it fully.

This should be repeated two or three times with plain tepid water, so as to remove all mucus or pus from the urethra before the medicated fluid is forced into the canal, where it should be held for five or ten minutes by closing the orifice of the urethra with the finger.

Injections of sweet oil into the urethra will often facilitate the introduction of an exploring sound or bougie in urethral strictures.

Injections are also made into the external meatus of the ear, the Eustachian tubes, or into pathological cavities, abscesses, sinuses, etc., for cleansing purposes.

Injections have been made into the pleural cavity in various affections, and even tuberculous cavities in the lungs have been washed out

by injections. Canals made by penetrating foreign bodies, as by bullets, bayonets, etc., are also kept clean by these means.

The nasal douche, which is now so frequently made use of in the unfortunately too frequent and often very intractable catarrhal affections, is a form of injection made with some form of fountain syringe, letting a current of water run into one nostril and out at the other. The patient should throw the head well forward, open the mouth and not inhale through the nose, so that the soft palate closes against the fauces. Injections into the nose should at first consist only of tepid water, until the patient becomes accustomed to the procedure.

Nourishing injections, or introduction of liquid food into the stomach through a tube may become necessary in certain diseases of the pharynx, larynx, or œsophagus, or in insane who refuse to eat or drink. This is a very simple proceeding, the head of the patient being thrown back the œsophageal tube is easily slipped on into the stomach, and the liquid poured in through a funnel, and the tube is then withdrawn.

It is not unusual now to wash out the stomach in chronic dyspepsia or ulceration, which may be done by introducing the tube as already explained, and distending the stomach moderately by filling in water through a funnel ; then by bending the external end of the tube downward it can be made to act as a siphon and the stomach be completely emptied, and this process of alternately filling and emptying may be repeated until the stomach is thoroughly cleansed. This method of treatment may also be used in *sarcina ventriculi*, or in cases of poisoning.

SUBCUTANEOUS INJECTIONS

consist in the introduction of substances under the skin. They are made by means of subcutaneous injection syringes, which are provided with hollow needles or nozzles. The syringes are usually graduated in minims, so that any desirable quantity of fluid may be used.

The syringe is filled to the required extent, and the needle then fastened to it ; the point is held upward and the piston carefully and slowly pushed in until all air is expelled from the instrument. A fold of the skin is then taken up, and the needle quickly pushed through the skin into the subcutaneous areolar tissue and the liquid slowly injected.

Care should be taken that no injury is inflicted on a vessel or nerve. The injection of fluid or air directly into a vein is sometimes accompanied by alarming or even dangerous symptoms. The injection in the region about the insertion of the deltoid muscle, or in the small of the back, is least liable to be followed by disagreeable results ; but it must

not be forgotten that the local irritation produced by the remedy used may produce inflammations and abscesses.

Care should be taken, of course, not to employ the same needle in syphilitic and non-syphilitic patients.

Various remedies, as curare, morphine, atropine, strychnine, alcohol, ether, ammonia, quinine, corrosive sublimate, etc., have been employed in this manner, and as the action of the remedy when thus given is very prompt and energetic, considerably smaller doses must be given than when the medicine is to be swallowed.

The effects produced by subcutaneous injections are local as well as general. They are indicated when it is desirable to obtain the action of a remedy as promptly as possible, as when we give atropine in threatened failure of the heart's action, or apomorphia as an emetic in cases of poisoning; when we wish to combine a decided local effect with the systemic effect, as in injections of morphia in neuralgia, or of strychnia in local paralysis; or finally, when the introduction of the remedy into the stomach is impossible, on account of persistent vomiting or mechanical obstruction, as lock-jaw, hydrophobia, etc., or by the refusal of the patient to take medicines.

The following are a few of the more important preparations which may be given in subcutaneous injection:

APOMORPHINE.

Dissolve one part of hydrochlorate of apomorphine in one hundred parts of distilled water (or 0.1 gram in 10 cubic centimeters—1 grain in 100 minims).

Dose of this solution 0.3 to 0.5 cubic centimeter (5 to 8 minims).

ARSENIC.

Mix one part of Fowler's solution with four parts of distilled water (or 1 cubic centimeter with 4 cubic centimeters—15 minims with 60 minims).

Dose of this solution 0.5 to 1 cubic centimeter (8 to 15 minims).

ATROPINE.

Dissolve one part of sulphate of atropine in five hundred parts of distilled water (or 0.01 gram in 5 cubic centimeters—$\frac{1}{6}$ grain in 80 minims).

Dose of this solution 0.3 to 1 cubic centimeter (5 to 15 minims), the larger doses with extreme caution.

ATROPINE AND MORPHINE COMBINED.

Dissolve one part of sulphate of atropine and four parts of sulphate of morphine in five hundred parts of distilled water (or 0.015 gram atropine sulphate and 0.06 gram morphine sulphate in 7.5 cubic centimeters water—$\frac{1}{4}$ grain atropine sulphate and 1 grain morphine sulphate in 125 minims water).

Dose of this solution 0.3 to 1 cubic centimeter (5 to 15 minims), the larger doses with extreme caution.

CORROSIVE SUBLIMATE.

Dissolve one part of corrosive sublimate in one hundred and twenty parts of water (or 0.1 gram in 12 cubic centimeters—1 grain in 120 minims).

NOTE.—Instead of distilled water a mixture of one part of glycerin with three parts of water is preferred by some.

Dose of this solution 0.5 to 1 cubic centimeter (8 to 15 minims).

CURARE (WOORARA).

Dissolve one part of curare in one hundred parts of distilled water (or 0.1 gram in 10 cubic centimeters—1 grain in 100 minims).

Dose of this solution 0.3 to 1.3 cubic centimeter (5 to 20 minims), the larger doses with extreme caution.

ETHER.

Dose.—One cubic centimeter (15 minims), repeated as indicated.

EXTRACT OF ERGOT.

Dissolve one part of extract of ergot in six parts of water (or 1 gram extract in 6 cubic centimeters water—15 grains extract in 90 minims water.)

Well-made fluid extract of ergot may be injected without dilution.

Dose of this solution 0.3 to 2 cubic centimeters (5 to 30 minims).

MORPHINE.

Dissolve one part of hydrochlorate of morphine in twenty parts of glycerin by the aid of heat, and when solution is effected add twenty parts of distilled water (or 0.5 gram in 10 cubic centimeters each of glycerin and water—4 grains in 80 minims each of glycerin and water).

NOTE.—This solution keeps well.

Dose of this solution 0.3 to 0.6 cubic centimeter (5 to 10 minims).

Or, dissolve one part of tartrate of morphine in sixty parts of distilled water (or 0.1 in 6 cubic centimeters—1 grain in 60 minims).

NOTE.—If the tartrate cannot be obtained the sulphate may be used instead in the same proportions.

Dose of this solution 0.3 to 1 cubic centimeter (5 to 15 minims).

QUININE.

Dissolve one part of bisulphate of quinine in three parts of distilled water and add three parts of glycerin (or 1 gram in 3 cubic centimeters each of glycerin and water—15 grains in 45 minims each of glycerin and water).

Dose of this solution 0.5 to 2 grams (8 to 30 minims).

NOTE.—Merck manufactures and sells a preparation of quinine under the name of "Quinia Bimuriatica Carbamidata," which is especially fitted for subcutaneous injection, being very soluble and also unirritating. DOSE.—0.3 to 0.5 gram (5 to 8 grains).

STRYCHNINE.

Dissolve one part of sulphate of strychnine in two hundred and fifty parts of distilled water (or 0.1 gram in 25 cubic centimeters—1 grain in 250 minims).

Dose of this solution 0.3 to 0.5 cubic centimeter (5 to 8 minims).

Inula; U. S.

INULA.

Inulæ Radix, Radix Helenii—Alantwurzel, Helenenwurzel, G.; *Racine d'aunée, Aunée Commune*, F.; *Alandsrot*, Sw.; *Elecampane.*

Origin.—*Inula Helenium*, Linné (*Compositæ*).

Habitat.—Europe and North America.

Part used.—The root.

Description.—See the Pharmacopœia, page 185. Sliced as it occurs in the market, the drug is made up of disks and irregular pieces (split lengthwise), externally grayish-brown, internally whitish, fleshy, full of resin cells. Odor aromatic, peculiar; taste bitter, aromatic. Old roots are tough, almost inert. The drug must consist of young, sound root, of good light color, and aromatic odor.

Constituents.—*Volatile oil* and *resin*, to which the odor and taste are due; also a crystallizable substance called *helenin*, a quantity of *bitter extractive*, and a large quantity (from twenty to forty-four per cent., according to the season and the age of the drug, young roots col-

lected in the autumn containing the most) of *inulin*, a peculiar variety of starch which is also found in taraxacum and in a number of other drugs, and which is not colored blue by iodine. It has the same composition as starch, and resembles it in some respects, but unlike starch it dissolves perfectly to a clear solution in three times its weight of boiling water, depositing again on cooling.

Medicinal Uses.—Elecampane is stimulant and tonic, and is mainly employed as a domestic remedy in *dyspepsia*, *chronic pulmonary troubles*, and in *menstrual derangements*.

Dose.—One to five grams (15 to 75 grains), in infusion.

Iodoformum; U. S.

IODOFORM.

Description and Tests.—See the Pharmacopœia, page 186. Very small lemon-yellow, brilliant crystals, of a heavy penetrating odor, reminding of iodine and saffron.

The odor of iodoform is so penetrating and persistent that it is necessary to guard carefully against exposing other substances, and also implements, to an atmosphere charged with iodoform vapor or against contact with this chemical. When iodoform has been weighed on the scales the latter must be immediately and carefully cleaned.

Iodoform readily absorbs moisture from the air. It must be kept in tightly closed bottles, and in a cool place.

The solubility of iodoform in ether furnishes a good indication of its purity.

To powder iodoform, triturate it with sufficient strong ether to form a thin paste, and then continue the trituration until the ether has evaporated, when the iodoform will remain as an impalpable powder. It is often applied externally in this form.

Medicinal Uses.—Internally this substance has been used to allay pain in *neuralgia*, *cancer*, etc. Externally it is much used as an antiseptic application to *surgical wounds*. Also to *syphilitic*, *scrofulous*, and *indolent ulcers*, *gangrene*, *buboes*, etc. It may be dusted on the parts by means of an insect-powder gun or a pepper-box, or applied in solution or ointment.

Iodoform poisoning has occurred from absorption of the substance from large wounded surfaces. Various methods have been used to disguise the offensive odor of iodoform, such as mixing with oil of peppermint, eucalyptus, etc., but without much success.

Dose for internal use, 0.05 to 0.2 gram (1 to 3 grains) three times a day, in coated pills.

IODOFORM PAINT.

Put two grams (30 grains) iodoform into a wide-mouthed bottle with ten grams (3½ fluidrachms) strong ether, and keep it tightly corked. A saturated solution of iodoform is thus obtained, which may be applied by means of a camel's-hair pencil.

IODINIZED IODOFORM PAINT.

Put two grams (30 grains) iodoform and two grams iodine into a wide-mouthed bottle with twenty grams (about 7 fluidrachms) strong ether. Used as iodoform paint (see above).

IODOFORMI UNGUENTUM; U. S.

IODOFORM OINTMENT.

Mix four grams (⅛ ounce) iodoform and thirty-six grams (1⅛ ounce) benzoinated lard.

Iodum; U. S.

IODINE.

Iodinium, Phar. 1870.

Description and Tests.—See the Pharmacopœia, page 186. Purplish-black, crystalline plates of a graphite-like metallic lustre. Odor strong, heavy, characteristic; taste very acrid. The bottle containing it is always filled with a violet gas. Strikes a blue color with starch paste; but to produce this reaction the iodine must be used in very small quantity, as, for instance, in the form of the official test-solution of iodine.

Must be kept in bottles with well-fitting glass stoppers, and in a cool place.

Iodine frequently contains moisture, and sometimes in very large quantity. This is detected by dissolving it in chloroform, with which pure iodine makes a clear solution, but when moisture is present a turbid one.

Spots from iodine on the skin are readily removed with ammonia or with hyposulphite of sodium.

Medicinal Uses.—Iodine is a valuable alterative and discutient. It is given internally and used externally to cause the absorption of *morbid growths* and *swellings*.

It is especially useful in affections of the glands, producing absorption of *enlarged glands*, *goitre*, *scrofulous enlargements*, etc.; but it

must be used with caution, as it may also cause the absorption of the testicles or mammæ.

In *intermittent fever* it has produced cures even after quinine had failed. For this purpose the tincture is given in doses of 0.3 to 1 cubic centimeter (5 to 15 minims), largely diluted in water, with enough of iodide of potassium to maintain solution.

In *syphilis* iodine is a most valuable remedy, especially in the tertiary stages, the *affections of the bones, gummata*, etc. ; also in the affections of the nervous system depending on this disease.

In *chronic lead-poisoning* iodine eliminates lead from the system.

It is applied externally in *erysipelas, glandular swellings*, many *cutaneous affections, enlarged* or *inflamed joints ;* locally to *enlarged tonsils, inflamed cervix uteri*, and as an injection into the sac of *hydrocele, spina bifida, fistulas, sinuses*, and *indolent abscesses.*

Dose.—About 0.015 gram ($\frac{1}{4}$ grain), in tincture or solution, with iodide of potassium and water. Generally given in the form of iodides.

Toxic Effects.—Excessive doses produce the effects of an irritant poison, causing inflammation of the stomach and intestines. Starch should be given freely as an antidote, but emetics must also be given, as the iodide of starch is not insoluble, but only milder in its action than pure iodine.

When given for some length of time, iodine and iodides produce a peculiar condition termed *iodism*, which shows itself by general indisposition, coryza, inflammation of the eyes and eyelids, frontal headache, and an eruption which sometimes has been mistaken for syphilitic skin affection.

This condition must be combated by withdrawing the remedy and administering bitter tonics, ordering baths, etc.

IODATUM COLLODIUM.

Iodinized Collodion.

Dissolve two grams (30 grains) iodine in thirty grams (1 ounce) collodion.

IODATUM AMYLUM; U. S.

Iodized Starch.

Triturate five grams (77 grains) iodine with a little distilled water until reduced to powder. Then add gradually ninety-five grams (3 ounces 154 grains) starch. Continue the trituration until the whole mixture assumes a uniform blackish-blue color. Dry it at not above 40° C. (104° F.), and then rub it into fine powder.

Should be preserved in glass-stoppered vials.

It is not a chemical combination, or a very imperfect and indefinite one. Contains five per cent. iodine.

Has been given in doses of one ounce three times a day, but the usual doses should be much smaller. It is very seldom used, although the preparation is very suitable for the internal administration of iodine.

"Iodide of Amyl" is an entirely different substance, with which the idodized starch should not be confounded, as was the case when the title of the latter was "Amyli Iodidum."

IODI LINIMENTUM; B.

Iodine Liniment.

Dissolve one hundred grams (3 ounces 230 grains) iodine, forty grams (1 ounce 180 grains) iodide of potassium, and twenty grams (308 grains) camphor in enough rectified spirit to make one liter (34 fluid-ounces) of finished product.

Stimulant and discutient embrocation.

IODI LIQUOR COMPOSITUS; U. S.

Compound Solution of Iodine.

Liquor Iodinii Compositus, Phar., 1870—*Lugol's Solution.*

Dissolve five grams (77 grains) iodine and ten grams (154 grains) iodide of potassium in eighty-five grams (3 ounces) distilled water.

Must be kept in well-corked or glass-stoppered bottles.

This is the form in which iodine is most frequently administered internally when given alone. Used also for external application.

Dose.—0.2 to 0.5 cubic centimeter (3 to 8 drops) in sweetened water.

IODI TINCTURA; U. S.

Tincture of Iodine.

Jodtinktur; G. and Sw.

Triturate eight grams (124 grains) iodine with a small quantity of alcohol until reduced to coarse powder. Put this into a tared, glass-stoppered bottle, add enough alcohol to make the total contents weigh one hundred grams (3 ounces 230 grains), and set it in a warm place until all the iodine has dissolved.

Unless the iodine is powdered and its solution aided by digestion, it requires several days to make the tincture.

Used for external application in cases of *glandular swellings, erysipelas, ringworm*, etc.

IODI TINCTURA DECOLORATA.

Decolorized Tincture of Iodine.

Dissolve forty grams (1 ounce 180 grains) iodine in three hundred and ninety cubic centimeters (13 fluidounces) alcohol. Add ninety cubic centimeters (3 fluidounces) stronger water of ammonia, and let the mixture stand in the light for four weeks.

The preparation contains ethyl iodide, iodide of ammonium, etc.

Care should be taken not to disturb the bottle so long as it contains any sediment, as iodide of nitrogen is liable to be formed, which is a very violently explosive compound even when wet.

This decolorized tincture of iodine is better than that of the German Pharmacopœia, which contains sulphate of sodium, etc.

Prof. Charles O. Curtman, M.D., of St. Louis, prepares this tincture by adding the water of ammonia to the tincture of iodine, and then adding a few drops of carbolic acid, which produces decoloration almost instantly.

For cosmetic reasons this tincture is often preferred to the ordinary tincture of iodine, which latter is probably more active.

IODI UNGUENTUM; U. S.

Iodine Ointment.

Triturate four grams (52 grains) iodine and one gram (15½ grains) iodide of potassium with two grams (½ fluidrachm) water until dissolved, and afterward with ninety-three grams (3 ounces 123 grains) benzoinated lard until thoroughly mixed.

IODI VAPOR; B.

Inhalation of Iodine.

Use four cubic centimeters (1 fluidrachm) tincture of iodine and thirty-two cubic centimeters (1 fluidounce) water, applying gentle heat to the mixture to vaporize the iodine.

Ipecacuanha; U. S.

IPECAC.

Ipecacuanhæ Radix—Brechwurzel, Ruhrwurzel, G.; *Racine Brésilienne*, F.; *Ipecacuana, Bejuquillo*, Sp.; *Kräkrot*, Sw.

Origin.—*Cephaëlis Ipecacuanha*, A. Richard (*Rubiaceæ*).

Habitat.—Brazil. Imported from Rio.

Part used.—The root.

Description.—From ten to twenty centimeters (2 to 4 inches) long, and about four millimeters ($\frac{1}{6}$ inch) in diameter. Has the appearance of being made up of transverse rings ("annulated") separated by deep fissures here and there. The dust of the drug (in powdering) is very irritating to the respiratory organs.

FIG. 331.—Ipecacuanha, natural size.

Tests.—A good drug consists of only the plump middle portions of the roots, has distinct rings, and a bark which is at least as thick as the diameter of the wood. Pieces with a smooth bark are to be rejected.

Constituents.—From one-third to three-fourths per cent. *emetine*, contained in the root-bark. This is an alkaloid which when pure is white, amorphous, soluble in alcohol, also, though less readily, soluble in water, inodorous, bitter. In the drug it is combined with *ipecacuanhic acid*. Besides, ipecac contains about thirty per cent. starch, four per cent. sugar, and traces of a volatile oil of nauseous odor.

FALSE IPECACUANHA ROOTS.

Striated ipecac, obtained from *Psychotria emetica*, Linné, has no transverse rings, but the thick bark is divided in sections of irregular lengths by fissures. It is dark purplish-brown.

Undulated ipecac, from *Richardsonia scabra*, St. Hilaire, has indistinct, if any, rings and fissures. It is gray.

White ipecac, from *Ionidium Ipecacuanha*, Vent., is whitish or pale brownish-yellow, and has no rings; the wood is thick, yellowish.

None of these false ipecacuanhas are met with in the American market.

Medicinal Uses.—Ipecac is a safe and efficient emetic, very frequently employed. It is a *special emetic*, acting only after absorption, and, therefore, rather tardy in its effects, on which account it is inappropriate in cases of poisoning, etc., when a prompt effect is desired.

In large doses it sometimes acts as a purgative. In small doses it is simply nauseant, and, like other nauseants, produces increased expectoration and perspiration.

Ipecac is much used in *bronchial* and *pulmonary affections*, in *fevers* alone or in combination with opium, in *dysentery*, and in some cases of *vomiting*, as in *vomiting of pregnancy*, of *drunkards*, etc.

Dose.—As an emetic, one to two grams (15 to 30 grains). As a nauseant, 0.05 to 0.10 gram (1 to 2 grains) at short intervals. In dysentery a dose of four to five grams (60 to 75 grains) is sometimes given, to affect the stools. Vomiting is prevented by giving it nearly dry and keeping the patient perfectly quiet in the recumbent position. If necessary the administration of this drug may be preceded by a dose of morphine or bitter almond water.

IPECACUANHÆ ET OPII PULVIS; U. S.

Powder of Ipecac and Opium.

Dover's Powder.

See title "Opii et Ipecacuanhæ Pulvis."

IPECACUANHÆ ET OPII SYRUPUS.

Syrup of Ipecac and Opium.

See title "Opii et Ipecacuanhæ Syrupus."

IPECACUANHÆ ET OPII TINCTURA; U. S.

Tincture of Ipecac and Opium.

See title "Opii et Ipecacuanhæ Tinctura."

IPECACUANHÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Ipecacuanha.

To make five hundred cubic centimeters (or 17 U. S. fluidounces).

Moisten five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of ipecac, in No. 80 powder, with one hundred and seventy-five grams ($7\frac{1}{3}$ fluidounces) alcohol. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Percolate with alcohol until exhausted. Distil off the alcohol, discontinuing the distillation when two hundred and fifty cubic centimeters ($8\frac{1}{2}$ fluidounces) remains in the still. To this remainder add five hundred cubic centimeters (17 fluidounces) of water. Evaporate the mixture to three hundred and seventy-five cubic centimeters ($12\frac{3}{4}$ fluidounces); let it cool, and then filter it. Wash the precipitated resin left on the filter by pouring a little water

upon it until the washings pass through tasteless. Mix the filtrate and the washings, and then evaporate the whole to two hundred and fifty cubic centimeters (8½ fluidounces). Let cool, and then add enough alcohol to make the whole measure five hundred cubic centimeters (17 fluidounces).

Each cubic centimeter of the fluid extract represents one gram of ipecac ; one fluidounce represents four hundred and fifty-five and two-thirds grains, and one fluidrachm nearly fifty-seven grains.

This new preparation is an excellent one, containing all the virtues of the drug and mixing clear with water or syrup.

Dose.—As an emetic, one to two cubic centimeters (15 to 30 minims) ; as an expectorant, 0.1 to 0.25 cubic centimeter (2 to 4 minims).

IPECACUANHÆ INFUSUM.

Infusion of Ipecac.

From ten grams (about ⅓ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Each fluidounce contains about nine grains of ipecac.

Dose.—As an emetic, twenty-five to fifty cubic centimeters (6 to 12 fluidrachms), given at intervals of ten minutes until the effect is produced ; as an expectorant, in doses of two to five cubic centimeters (½ to 1 fluidrachm). Used also in the treatment of dysentery.

IPECACUANHÆ SYRUPUS; U. S.

Syrup of Ipecac.

Mix thirty cubic centimeters (1 fluidounce) fluid extract of ipecac and four hundred and thirty cubic centimeters (or 14½ fluidounces) simple syrup.

The new fluid extract of ipecac makes a perfectly clear syrup.

Dose.—Emetic, fifteen to twenty-four cubic centimeters (4 to 6 fluidrachms) ; expectorant, two to four cubic centimeters (½ to 1 fluidrachm).

IPECACUANHÆ TINCTURA.

Tincture of Ipecac.

Mix thirty cubic centimeters (1 fluidounce) fluid extract of ipecac with two hundred and seventy cubic centimeters (9 fluidounces) diluted alcohol.

Dose.—Emetic, eight to twelve cubic centimeters (2 to 3 fluidrachms); expectorant, one to two cubic centimeters (15 to 30 minims).

IPECACUANHÆ TROCHISCI; U. S.

IPECAC TROCHES.

Mix thoroughly, by trituration, 1.60 gram (25 grains) ipecac, in No. 80 powder, 1.60 gram (25 grains) tragacanth, in No. 80 powder, and sixty-five grams (1,000 grains) finely powdered sugar, and then form the mixed powders into a mass with sufficient syrup of orange, and divide it into one hundred troches.

Each troche contains one-sixth grain ipecac.

Used in *coughs* and *colds*, especially if the bronchial tubes, larynx, and fauces are dry and inflamed.

They are slowly dissolved in the mouth at intervals of an hour or two.

IPECACUANHÆ VINUM; U. S.

WINE OF IPECAC.

Mix thirty cubic centimeters (or 1 fluidounce) fluid extract of ipecac, and four hundred cubic centimeters (or 13½ fluidounces) stronger white wine.

Each cubic centimeter (16 minims) contains 0.07 gram (1.08 grain) ipecac.

Used in cough mixtures as an expectorant.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Iris Florentina.

ORRIS ROOT.

Iridis Florentinæ Rhizoma, Iridis Radix, Radix Violarum— *Veilchenwurzel*, G.; *Iris de Florence*, F.; *Lirio de Florencia*, Sp.; *Violrot*, Sw.; *Florentine Orris.*

Origin.—*Iris pallida*, Lamarck; *Iris germanica*, Linné; *Iris florentina*, Linné (*Iridaceæ*).

Habitat.—Northern Italy.

Part used.—The rhizome.

Description.—Simple or branched, flattened, jointed, five to ten centimeters (2 to 4 inches) long, about twenty-five millimeters (1 inch) broad; with a circular scar at the upper extremity, and brownish scars from the rootlets on the under side; wrinkled lengthwise, or smooth and angular from the peeling; externally whitish or yellowish-white; heavy, hard; fracture short, mealy; nucleus sheath most prominent in the lower half; within and near the nucleus sheath may be seen scat-

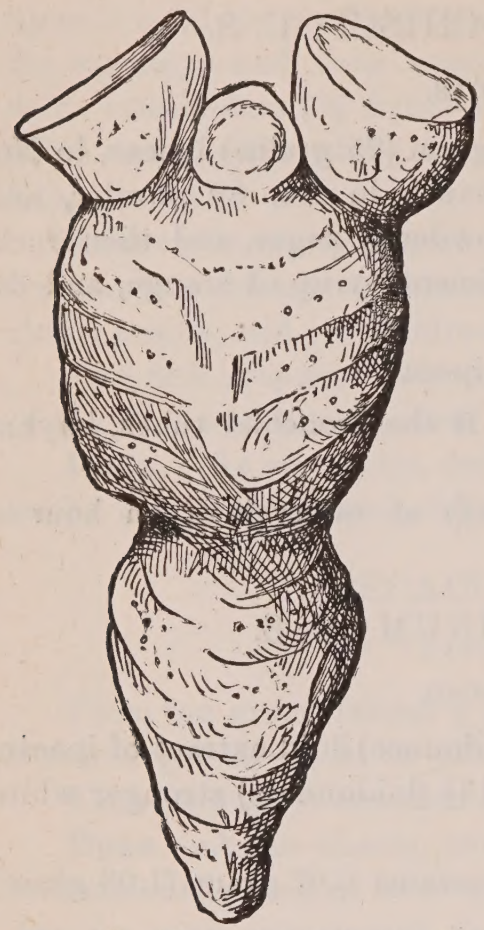


FIG. 332.—Florentine Orris, natural size.

tered fibro-vascular bundles. Odor agreeable, violet-like ; taste insipid, afterward bitter, slightly acrid.

Varieties.—*Florentine orris root* is the best. It is whiter, more carefully peeled, and has a finer odor than the *Verona orris root*, which is somewhat yellowish.

Finger orris root consists of picked, slender, nearly straight pieces, smoothly trimmed, and usually whitened with chalk, magnesia, or starch. It is intended for the use of teething infants only.

Tests.—Orris root is frequently found to be worm-eaten. Only sound pieces of good odor and light color should be used.

Constituents.—*Volatile oil* (Oleum iridis) a very small quantity. Also an acrid resin, besides starch, mucilage, etc.

Medicinal Uses.—Florentine orris root is seldom employed internally. It is said to be alterative, cathartic, and diuretic. It is mostly employed as an ingredient of tooth-powders, or in the form of tincture as an ingredient of perfumes and flavoring extracts.

IRIDIS FLORENTINÆ TINCTURA.

TINCTURE OF FLORENTINE ORRIS.

Percolate five hundred grams (17⅔ ounces) coarsely powdered orris root with diluted alcohol to obtain one thousand cubic centimeters of tincture.

Used in the preparation of perfumery, flavoring extracts, etc.

IRIDIS OLEUM.

OIL OF ORRIS [ROOT].

Distilled from Florentine orris root. Pale yellowish, solid at ordinary temperatures. Has a fine violet odor.

Consists of myristic acid, mixed with a small proportion of volatile oil.

"*Liquid oil of orris*" is very inferior, consisting partly of oil of cedar-wood.

Both kinds are used in perfumery only.

Iris [Versicolor]; U. S.

IRIS [VERSICOLOR].

Iridis Versicoloris Rhizoma, Iris Versicolor—Blue Flag.

Origin.—*Iris versicolor*, Linné (*Iridaceæ*).

Habitat.—North America.

Part used.—The rhizome.

Description.—See the Pharmacopœia, page 187. In the dry drug the rootlets are usually entirely absent.

Constituents.—Acrid resin, tannin, and other substances. No analysis. It has been hinted that it may contain an alkaloid.

Nomenclature.—Florentine orris has long been known as "Radix Iridis;" the rhizome of iris versicolor, on the contrary, is only recently brought into notice. It is therefore unfortunate that the title "Iris," without qualification, has been adopted for iris versicolor.

Medicinal Uses.—Blue flag is a powerful emetic and cathartic when fresh. When dry it is not so violent in its action, and is a hydragogue cathartic, cholagogue, sialagogue, diuretic, and alterative.

It is employed in *chronic derangements of the liver and kidneys*, in *dropsies*, and as an alterative in *scrofulous* and *syphilitic affections*.

Dose of the dried root, 0.5 to 1.5 gram (8 to 22 grains) in powder, combined with aromatics and carminatives when given in large doses.

FIG. 333.—Blue Flag, large specimen, natural size.

IRIDIS [VERSICOLORIS] EXTRACTUM; U. S.

EXTRACT OF IRIS [VERSICOLOR].

From five hundred grams (17⅔ avoirdupois ounces) of the drug in No. 60 powder.

As a *first menstruum* use a mixture of eleven hundred and twenty-five grams (47 fluidounces) alcohol, and three hundred and seventy-five grams (about 12½ fluidounces) water.

As a *second menstruum* use a sufficient quantity of diluted alcohol.

Moisten with two hundred grams (about 8 fluidounces) of the *first menstruum*. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate to exhaustion, or

until fifteen hundred grams (56 to 60 fluidounces) of percolate has been received. Distil off the alcohol in the usual way, and evaporate the remainder by water-bath heat to the pilular consistence. No glycerin is to be added.

The same product is obtained by evaporating the fluid extract.

New to the U. S. Pharmacopœia. Brown.

Dose.—0.015 to 0.06 gram ($\frac{1}{4}$ to 1 grain).

IRIDIS [VERSICOLORIS] EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Iris [Versicolor].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12$\frac{1}{2}$ fluidounces) alcohol to every one hundred grams (about 3$\frac{1}{3}$ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 7 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15$\frac{1}{4}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Jalapa; U. S.

Jalap.

Jalapæ Tuber—Jalapenknollen, G.; *Jalape*, F.; *Jalapa*, Sp.; *Jalappa*, Sw.

Origin.—*Exogonium purga*, Bentham (*Convolvulaceæ*).

Habitat.—Eastern Mexico.

Part used.—The tuberous root.

Description.—See the Pharmacopœia, page 187. Turnip-shaped, or more oblong, deeply wrinkled, the larger pieces cut, the lower portion tapering rather abruptly to a narrow root, which is cut off near the tuber; hard, heavy, tough.

Constituents.—From twelve to eighteen per cent. resin, about eighteen per cent. starch, and about the same amount of sugar.

The resin is the important medicinal constituent. From three-fourths to nine-tenths of it is *convolvulin* (rhodeoretin), which is readily soluble in alcohol, but insoluble in ether; the remaining tenth part of the total resin is *jalapin* (para-rhodeoretin ?), a soft resin, soluble in ether and in bisulphide of carbon.

Tests.—The Pharmacopœia requires that the jalap shall contain at least twelve per cent. of resin. To determine the quantity of resin, exhaust ten grams (154 grains) of the finely powdered jalap with ninety-four per cent. alcohol; concentrate the tincture by evaporation until it

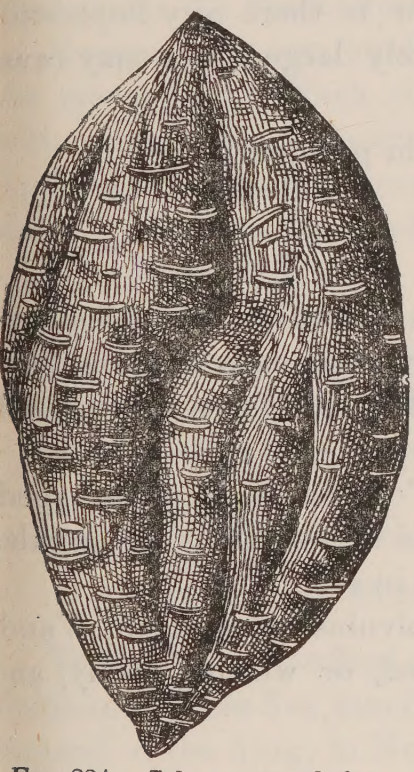


FIG. 334.—Jalap, natural size.

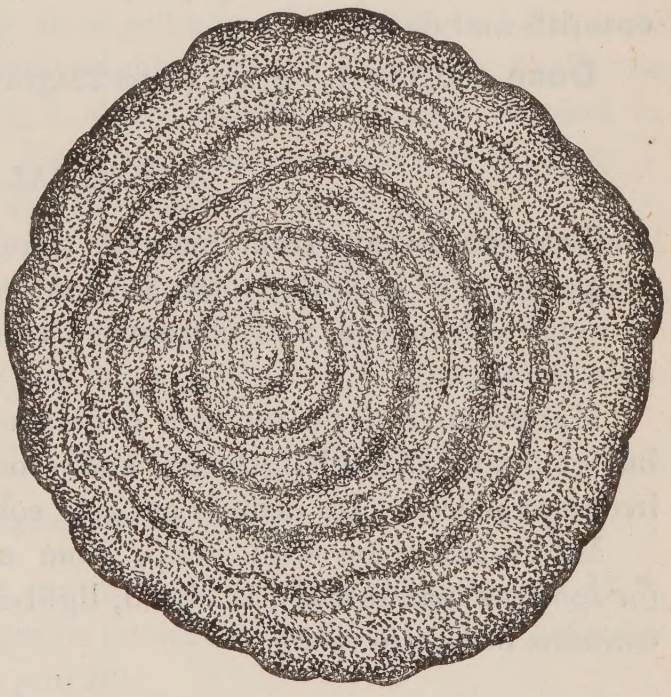


FIG. 335.—Transverse section of Jalap, natural size, large specimen.

measures about fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) and pour this into about two hundred and fifty cubic centimeters ($8\frac{1}{2}$ fluidounces) of cold distilled water; wash the precipitated resin on a small filter with cold distilled water, and then dry it carefully. The resin thus obtained should weigh not less than 1.20 gram ($18\frac{1}{2}$ grains), and it should yield but little of its weight to ether—that is, it should be almost entirely composed of *convolvulin*.

Jalap must be sound, heavy, and hard. Soft, sticky, or very dark-colored tubers must be rejected; also mealy, or very light-colored, or woody tubers.

The necessity of applying the Pharmacopœial test to samples of

jalap is obvious from what has been stated. It should also be applied to fluid extract of jalap, fifteen cubic centimeters (1¼ fluidrachm) of which when mixed with five hundred cubic centimeters (17 fluidounces) of cold water, should yield not less than 1.80 gram (27¾ grains) of convolvulin.

Medicinal Uses.—It is a powerful hydragogue cathartic. In doses of from ten to thirty centigrams (1½ to 5 grains) it is laxative; and one dose of one to two grams (30 to 60 grains) occasions a disagreeable sensation in the epigastrium, sometimes accompanied by vomiting, but followed in about two hours by watery stools with severe griping. This griping may be prevented by the addition of a few grains of camphor or cloves. Constipation does not follow, nor is there any impression on the nervous system by jalap. Excessively large doses may cause enteritis and death.

Dose.—0.5 to 1.5 gram (8 to 22 grains) in powder.

FALSE JALAP.

Tampico Jalap, from ipomœa simulans, Hanbury, resembles true jalap, but is of irregular form, without transverse ridges or scars, light in weight, collapsed, and contains a resin which is almost entirely soluble in ether.

Male Jalap, from ipomœa orizabensis, Pelletan, is spindle-shaped, but generally sliced lengthwise and crosswise into sections or angular irregular pieces. Its resin is entirely soluble in ether.

Mechoacan, or wild jalap, from convolvulus mechoacan, Vand. (or ipomœa pandurata), is sliced, light-colored, or whitish, mealy, and contains but little resin.

JALAPÆ ABSTRACTUM; U. S.

Abstract of Jalap.

Prepared as the other abstracts. See the Pharmacopœia, page 5.

The jalap ought to be in No. 60 powder. Dry alcoholic extract of jalap is two and a half times the strength of this abstract. Five grains good jalap, one grain alcoholic extract of jalap, two and one-half grains abstract of jalap, and three grains of the old extract of jalap of the Pharmacopœia of 1870, are severally equivalent in therapeutic effect.

Abstract of jalap is used in preparing the compound cathartic pills, according to the new U. S. Pharmacopœia (1880), being preferable to the extract of jalap for this purpose, the abstract being more uniform in strength and always in fine powder so as to be conveniently

ncorporated. The abstract is about twenty per cent. stronger than he extract of jalap of the Pharmacopœia of 1870, which preparation, as there directed to be made, contained a large quantity of inert extractive.

JALAPÆ EXTRACTUM ALCOHOLICUM; U. S.

Alcoholic Extract of Jalap.

From five hundred grams (17⅔ avoirdupois ounces) of jalap, in No. 50 powder.

As a menstruum use a mixture of alcohol and water in the proportion of four hundred grams (16⅔ fluidounces) alcohol to every one hundred grams (3⅓ fluidounces) of water.

Moisten with one hundred and twenty-five grams (5¼ fluidounces) of the menstruum. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Percolate until the liquid that passes produces only a slight precipitate when dropped in water. Distil off the alcohol. Evaporate the remainder to dryness.

Must be kept in small, well-closed bottles in a cool place.

Brown. Yield twelve to fifteen per cent. A material improvement is made in this process upon the preparation of 1870, in which a watery extract was incorporated with the alcoholic.

Dose.—0.15 to 0.50 gram (2 to 8 grains).

JALAPÆ EXTRACTUM FLUIDUM.

Fluid Extract of Jalap.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a menstruum use alcohol.

Should yield twelve per cent. *convolvulin.* (See "Jalapa.")

Dose.—One to two cubic centimeters (15 to 30 minims).

JALAPÆ PULVIS COMPOSITUS; U. S.

Compound Powder of Jalap.

Triturate thoroughly together thirty-five grams (1 ounce 100 grains) jalap, in No. 60 powder, and sixty-five grams (2 ounces 130 grains) bitartrate of potassium in fine powder.

Used mainly as a hydragogue cathartic in cases of *dropsy*, to remove accumulations of fluid.

Dose.—0.5 to two grams (10 to 30 grains).

JALAPÆ RESINA; U. S.

RESIN OF JALAP.

Jalap resin is prepared as follows: Five hundred grams (17⅔ ounces) jalap, in No. 60 powder, is moistened with one hundred and twenty-five grams (or about 5 fluidounces) alcohol; then packed tightly in a cylindrical percolator; saturate with the same menstruum; macerate forty-eight hours; percolate until one thousand grams (about 40 fluidounces) of percolate has been obtained, or until the drug is exhausted, which is seen by the absence of any marked turbidity when the percolate which passes is dropped into water. The alcohol is recovered by distillation on a water-bath until the remaining tincture has been reduced to two hundred grams (or about 7 ounces). This concentrated tincture is added during constant stirring to four thousand five hundred cubic centimeters (9½ pints) water. When the precipitate has subsided, the supernatant liquid is decanted, and the precipitate is washed twice, by decantation, with water. It is then transferred to a strainer, the liquid is pressed out, and the resin dried by means of a gentle heat.

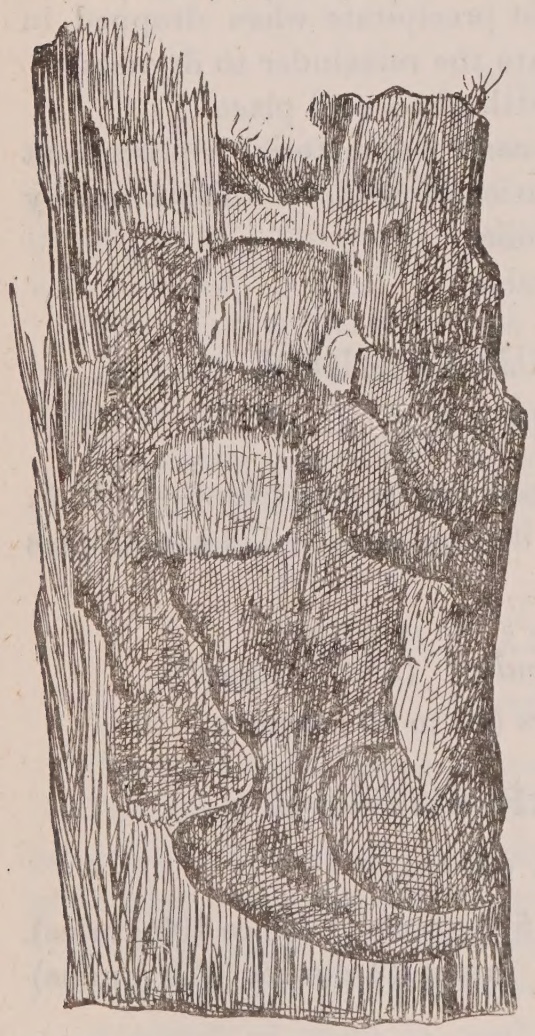


FIG. 336.—Butternut Bark, natural size.

For *tests*, see the Pharmacopœia, page 281.

Resin of jalap is frequently sold under the name of "jalapin." It is chiefly convolvulin, with some jalapin.

Dose.—0.12 to 0.3 gram (2 to 5 grains).

Juglans; U. S.

JUGLANS.

Juglandis Cortex—Butternut, Butternut Bark.

Origin.—*Juglans cinerea*, Linnê (*Juglandaceæ*).

Habitat.—North America.

Part used.—The inner bark of the root.

Description.—See the Pharmacopœia, page 188. Troughs, or flat pieces, from three to six millimeters (⅛ to ¼ inch) thick; smooth, dark-

rown and mottled on the outer surface, and nearly free from remnants f the external bark.

Constituents. — An orange-yellow, crystalline, acrid substance alled *nucin* (juglandic acid, or juglone) has been isolated. The drug lso contains tannin, some volatile oil, resin, and fourteen per cent. of xed oil.

Medicinal Uses.—Mild cathartic, not followed by intestinal weakess. Valuable in *chronic constipation* and other *intestinal troubles.*

Dose.—Five to ten grams (75 to 150 grains), best given in fluid xtract.

JUGLANDIS EXTRACTUM; U. S.

Extract of Juglans.

Moisten five hundred grams (17⅔ avoirdupois ounces) butternut ark, in No. 30 powder, with two hundred grams (8⅓ fluidounces) alcool. Pack it firmly in a cylindrical percolator, and, after saturating ith the menstruum, macerate twenty-four hours. Percolate to exaustion, or until fifteen hundred grams (about 60 fluidounces of perolate has been received. Distil off the alcohol, and evaporate the reainder to a pilular consistence, and add to it one-twentieth of its eight of glycerin.

Practically the same product is obtained by evaporating the fluid xtract to a pilular consistence and adding the five per cent. of glycerin.

The "Extract of Butternut" of the Pharmacopœia of 1870 was an queous extract, but the nature of the constituents of the drug shows hat an alcoholic extract must be a more rational and effective preparaion.

Dark brown.

Dose.—0.50 to two grams (8 to 30 grains).

JUGLANDIS EXTRACTUM FLUIDUM.

Fluid Extract of Juglans.

To make five hundred cubic centimeters (or its equivalent—17 U. S. luidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Juglandis Oleum.

NUT OIL.

Oleum Nucis Juglandis.

Prepared by expression from the crushed seeds of several species of *Juglandaceæ.*

The walnuts and hickory nuts have a fine, bland-tasting, fixed oil, to which the above title is applied. The yield is about twenty-five per cent.

It is one of the drying oils, containing linolein.

Description.—Pale straw-colored, or slightly greenish, rather thick, congealing at −20° C. (−40° F.). Has the specific gravity 0.92, and a nutty odor and taste.

Used like other bland fixed oils.

Juniperus; U. S.

JUNIPER.

Juniperi Fructus, Baccæ Juniperi — Wachholderbeeren, G.; *Genièvre, Fruit (Boies) de genièvre,* F.; *Enebro,* Sp.; *Enbär,* Sw.; *Juniper Berries.*

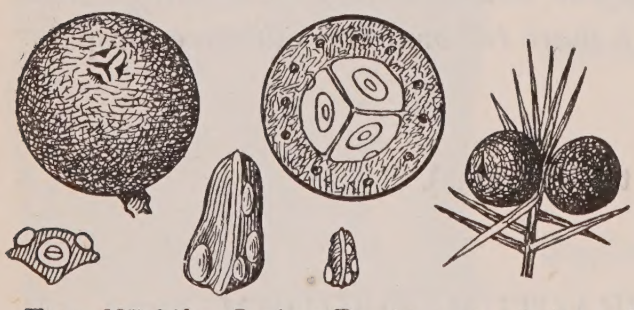
Origin.—*Juniperus communis,* Linné (*Coniferæ*).

Habitat.—The Northern hemisphere.

Part used.—The ripe fruit.

Description.—See the Pharmacopœia, page 188.

"Italian Juniper Berries" are the best.



FIGS. 337–342.—Juniper Berries, natural size and enlarged; transverse section, enlarged; seeds, natural size, enlarged, and transverse section enlarged, showing resin glands.

Constituents.—From one to two and a half per cent. volatile oil, and about fifteen to thirty per cent. sugar, some resin, etc.

Medicinal Uses.—Stimulant, diuretic, and emmenagogue, useful in *dropsies* due to obstruction of the tubules of the kidneys, as in scarlatina, etc.

A popular method of using this drug is to make a strong tincture by macerating sixty grams (2 ounces) of the bruised berries in five hundred cubic centimeters (1 pint) of whiskey or gin, and giving it in tablespoonful doses.

Juniper berries are often employed for fumigation by throwing a

handful on live coals, or on a hot stove or coal shovel, under the mistaken notion that they are disinfectants when thus used.

The fumes simply act by overcoming the sickening odors of the sick-room, substituting another scarcely less disagreeable smell.

JUNIPERI FRUCTUS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF JUNIPER BERRIES.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

JUNIPERI INFUSUM.

INFUSION OF JUNIPER BERRIES.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms), or about a wineglassful four or five times a day.

JUNIPERI SYRUPUS.

SYRUP OF JUNIPER BERRIES.

Roob Juniperi.

Pour five parts boiling water on one part bruised fresh juniper berries, and macerate twenty-four to forty-eight hours. Express, let settle, strain, and evaporate to the consistence of syrup.

Juniper berries contain about twenty-five per cent. sugar, which makes the syrup.

Dose.—Teaspoonful to tablespoonful.

Juniperi Lignum.

JUNIPER WOOD.

Occurs in chips of a light-yellowish color, fragrant with the odor of juniper turpentine.

Used as an ingredient in alterative and diuretic teas.

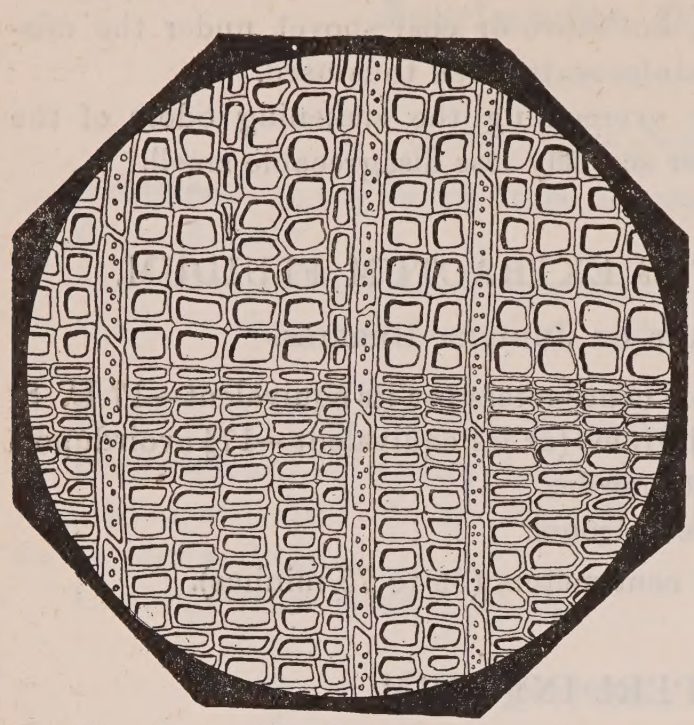


FIG. 343.—Juniper Wood, transverse section, magnified.

Juniperi Oleum; U. S.

OIL OF JUNIPER.

Juniperi Ætheroleum—*Volatile Oil of Juniper, Oil of Juniper Berries.*

Description, etc.—See the Pharmacopœia, page 237.

The volatile oil distilled from the wood is very different from that distilled from the berries, which is valued at about four times as much. The oil of juniper wood is often sold under the name of oil of juniper; but the oil of juniper, U. S. Phar. 1880, is always sold under the designation "Oil of Juniper Berries, Extra."

Used occasionally as a carminative and diuretic.

Dose.—0.3 to 0.5 cubic centimeter (5 to 8 minims).

JUNIPERI SPIRITUS; U. S.

SPIRIT OF JUNIPER.

Mix thirty grams (1 ounce 25 grains) volatile oil of juniper berries and nine hundred and seventy grams (34 ounces 100 grains, or about 40½ fluidounces) alcohol.

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm).

JUNIPERI SPIRITUS COMPOSITUS; U. S.

COMPOUND SPIRIT OF JUNIPER.

Mix ten grams (154 grains) volatile oil of juniper berries, one gram (15 grains) volatile oil of caraway, one gram (15 grains) volatile oil of fennel, and three thousand grams (105 ounces 360 grains, or about 125 fluidounces) alcohol. Then add gradually enough water to make the whole product weigh five thousand grams (176 ounces 160 grains, measuring about 12 pints).

Dose.—Ten to twenty cubic centimeters (2 to 5 fluidrachms).

Juniperus Virginiana.

RED CEDAR.

Origin.—*Juniperus virginiana*, Linné (*Coniferæ*).

FIG. 344. Juniperus rginiana, larged.

Habitat.—North America.

Part used.—The young twigs.

Description.—The twigs are about thirty millimeters ($1\frac{1}{5}$ inch) long, having a four-sided appearance caused by the arrangement of the leaves, which, as in savin, are scaly. They have a bright green color, a terebinthinate odor, and a warm, bitter taste.

Constituents.—Volatile oil, resin, etc.

Medicinal Uses.—This substance is stated to have een sold in place of savin. Its action somewhat resembles that of the tter drug, and an ointment made with the leaves is sometimes used as stimulating application to *ulcers*.

Kamala; U. S.

KAMALA.

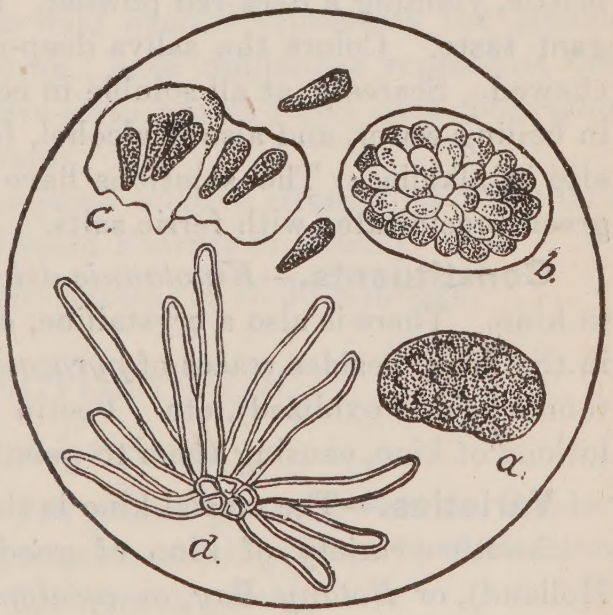
Rottleræ Glandulæ—Kameela, E.

Origin.—*Mallotus philippinensis*, Mueller Arg. (*Euphorbiaceæ*).

Habitat.—India, Arabia, etc.

Part used.—The glands and airs of the capsules.

Description.—See the harmacopœia, page 188. A ne, brown-red powder, insoluble water; soluble in alcohol, her, chloroform, and alkaline lutions, with deep red color. nder the microscope kamala is en to consist of irregular round lands, accompanied by colorless brownish hairs arranged in ellate clusters.



FIGS. 345–348.—Kamala, enlarged. *a*, gland in water; *b*, gland in dilute lye; *c*, broken gland, with isolated vesicles; *d*, stellate hair.

Constituents.—Nearly ghty per cent. resin, soluble in cohol. An ethereal concentrated solution of kamala solidifies after a w days' standing into a crystalline mass of *rottlerin*—minute, yellow, edle-like crystals, which soon change on exposure.

Medicinal Uses.—Used as a tænicide. It may be given with a small dose of hyoscyamus to prevent griping.

Dose.—Four to eight grams (60 to 120 grains), to be repeated in a few hours, if necessary.

KAMALA EXTRACTUM FLUIDUM.

FLUID EXTRACT OF KAMALA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug.

As a *menstruum* use alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Kino; U. S.

KINO.

Origin.—*Pterocarpus marsupium*, Roxburgh (*Leguminosæ*).

Habitat.—East India.

Part used.—The inspissated juice.

Description.—See Pharmacopœia, page 188. Small, shining, dark brown-red fragments, transparent in thin layers, with a ruby-red color; brittle, yielding a dark-red powder. Inodorous. Has a sweetish, astringent taste. Colors the saliva deep-red, and sticks to the teeth when chewed. Scarcely at all soluble in cold water; almost entirely soluble in boiling water, and also in alcohol, forming ruby-red solutions; soluble also in alkalies. The solutions have an acid reaction and give dirty green precipitates with ferric salts.

Constituents.—*Kinotannic acid* is the most important substance in kino. There is also a crystalline, colorless, neutral substance, *kinoin*, in the drug, besides traces of *pyrocatechin*, kino-red (formed when kinotannic acid is oxidized), etc. Pectin is also present, or is formed in solutions of kino, causing them to gelatinize when long kept.

Varieties.—The official kino is the so-called *Malabar kino*.

Another variety of kino of good quality is the *Australian* (New Holland), or *Botany Bay*, or *eucalyptus kino*, obtained from numerous species of eucalyptus. It contains gum instead of pectin, but like the true pterocarpus kino it gives dark-green precipitates with ferric salts.

Then there is *Butea* or *Bengal kino*, and other kinds not met with in trade in this country. These form black precipitates with iron salts.

Medicinal Uses.—Kino is a mild astringent much used in *diar-*

rhœas. It is frequently added to chalk mixture, and is indicated in those cases of *diarrhœa* accompanied by excessive *acidity of the stomach* or *intestines, pyrosis,* etc.

Dose.—0.5 to 1.5 gram (10 to 20 grains) in powder.

KINO EXTRACTUM LIQUIDUM.

Liquid Extract of Kino.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use two hundred and fifty grams (or its equivalent—$8\frac{5}{6}$ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use diluted alcohol.

Mix the kino with an equal bulk of clean sand of about the same fineness.

Moisten the drug with one hundred grams (about $3\frac{3}{4}$ fluidounces) of the menstruum. Pack it in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Each cubic centimeter of this fluid extract represents the soluble matter of one-half gram of the drug; each fluidounce represents two hundred and twenty-seven and five-sixth grains; and each fluidrachm nearly twenty-eight and a half grains.

"Fluid extract of kino" of the same relative strength as other fluid extracts cannot be made. (See Liquid Extract of Aloes.)

Dose.—One to two cubic centimeters (15 to 30 minims).

KINO TINCTURA; U. S.

Tincture of Kino.

Mix forty-five grams (1 ounce 260 grains) glycerin with one hundred and eighty grams (6 ounces 150 grains, measuring about $7\frac{1}{2}$ fluidounces) alcohol, and forty-five grams ($1\frac{1}{2}$ fluidounce) water.

Triturate thirty grams (1 ounce 25 grains) kino in a mortar, adding gradually one hundred and fifty grams (about 5 fluidounces) of the above mixture, and continue the trituration until the whole is reduced to a smooth paste. Put this into a bottle, add the remainder of the mixture, and macerate twenty-four hours, shaking it occasionally. Then

filter, adding through the filter enough of a mixture of alcohol and water, in the proportion of seventy-five cubic centimeters (2½ fluidounces) of alcohol to fifteen cubic centimeters (½ fluidounce) water, to make the final product weigh three hundred grams (10 ounces 255 grains, measuring about 10 fluidounces).

Dose.—Two to eight cubic centimeters (½ to 2 fluidrachms).

KINO PULVIS COMPOSITUS; B.

COMPOUND POWDER OF KINO.

Triturate together until thoroughly mixed seventy-five grams (2 ounces 282 grains) kino, in powder, five grams (77 grains) powdered opium, and twenty grams (309 grains) powdered cinnamon. This powder contains five per cent. of opium.

Used as an astringent opiate in *diarrhœas.*

Dose.—0.3 gram (5 grains) or more, according to the quantity of opium it is desired to prescribe.

Krameria; U. S.

KRAMERIA.

Krameriæ Radix—Ratanhawurzel, G.; *Ratanhia*, F.; *Ratania*, Sp.; *Ratanhia-rot*, Sw.; *Rhatany.*

Origin.—*Krameria triandra*, Ruiz et Pavon; and *Krameria tomentosa*, St. Hilaire (*Polygalaceæ*).

Habitat.—South America.

Part used.—The root.

Description.—The official krameria is of two distinct kinds—the *Peruvian* or *payta rhatany* from *krameria triandra*, obtained from Peru and Bolivia; and the so-called *savanilla rhatany*, from *krameria tomentosa*, coming from New Granada.

Peruvian krameria is knotty, about twenty-five millimeters (1 inch) thick, branched; the bark is externally blackish- or dark-red brown, irregularly fissured, more or less rough, interiorly lighter, coarsely fibrous. The wood is light, red-brown, tough. A transverse section shows the bark to be about one-sixth the total diameter. The bark is very astringent; the wood almost tasteless. Both inodorous. Pieces of small diameter are always to be preferred because in large knotty heads the wood preponderates too greatly; the bark, which contains the active matter, being proportionately thicker in about finger-thick pieces.

Savanilla rhatany is less knotty or branched, shorter, from quill- to

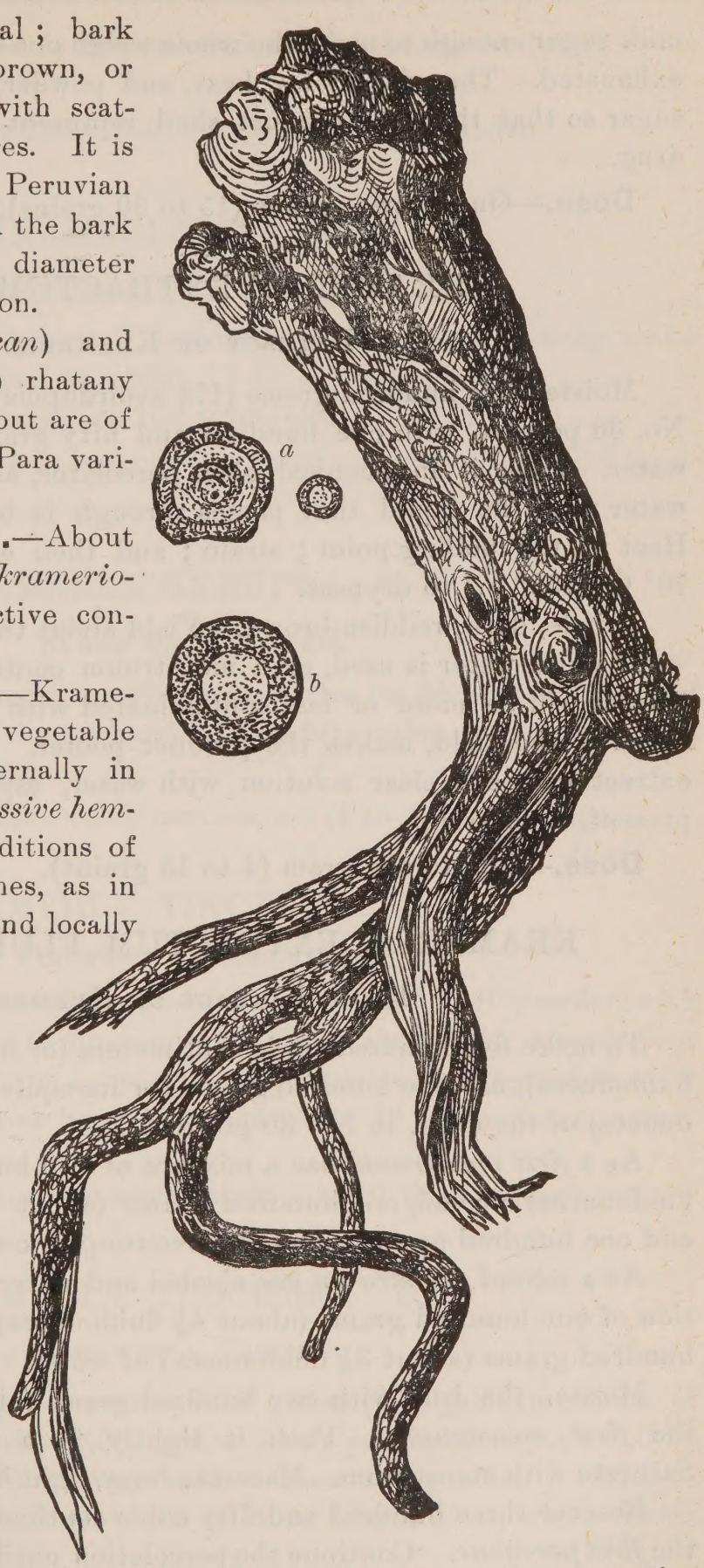
finger-thick, cylindrical; bark externally chocolate-brown, or somewhat purplish, with scattered transverse fissures. It is more brittle than the Peruvian or payta rhatany, and the bark is about one-third the diameter of the transverse section.

Mexican (or *Texan*) and *Para* (or *Brazilian*) rhatany resemble the official, but are of a darker color. The Para variety is flexible.

Constituents.—About twenty per cent. of *krameriotannic acid* is the active constituent.

Medicinal Uses.—Krameria is a powerful vegetable astringent, used internally in *chronic diarrhœas, passive hemorrhages*, relaxed conditions of the mucous membranes, as in *leucorrhœa* or *gleet*, and locally as a mouth-wash for *sore* or *spongy gums*, or as an injection in *leucorrhœa* or *gleet*.

It is not used in the form of powder.



FIGS. 349–352.—Peruvian Krameria. *a*, transverse sections of root and rootlet of same; *b*, transverse section of Savanilla Krameria; all natural size.

KRAMERIÆ ABSTRACTUM.

ABSTRACT OF KRAMERIA.

Exhaust coarsely powdered krameria by percolation with water. Evaporate the percolate to a soft extract. Add powdered

milk sugar enough to make the whole weigh one-half as much as the drug exhausted. Then dry by low heat, and powder, adding sufficient milk sugar so that the final product shall represent twice its weight of the drug.

Dose.—One to two grams (15 to 30 grains).

KRAMERIÆ EXTRACTUM; U. S.

Extract of Krameria.

Moisten five hundred grams (17⅔ avoirdupois ounces) of krameria, in No. 30 powder, with one hundred and fifty grams (5 fluidounces) cold water. Pack it in a conical glass percolator, and percolate with cold water until the liquid that passes through is but slightly astringent. Heat to the boiling point; strain; and then evaporate at not above 70° C. (158° F.) to dryness.

Brittle, dark, reddish-brown. Yield about twelve per cent.

If warm water is used, or a menstruum containing any alcohol, the extract will be more or less contaminated with resin, which, while increasing the yield, makes the product poorer. Properly prepared the extract makes a clear solution with water, especially when sugar is present, as in syrup.

Dose.—0.25 to one gram (4 to 15 grains).

KRAMERIÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Krameria.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred grams (about 8⅓ fluidounces) alcohol, one hundred grams (about 3⅓ fluidounces) water, and one hundred grams (about 3½ avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 7¼ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *second menstruum*

to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

KRAMERIÆ INFUSUM.

Infusion of Krameria.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

KRAMERIÆ SYRUPUS; U. S.

Syrup of Krameria.

Mix one hundred and five cubic centimeters (or $3\frac{1}{2}$ fluidounces) fluid extract of krameria with one hundred and fifty cubic centimeters (or 5 fluidounces) simple syrup.

Dose.—Two to fifteen cubic centimeters ($\frac{1}{2}$ to 4 fluidrachms).

KRAMERIÆ TINCTURA; U. S.

Tincture of Krameria.

Macerate sixty grams (926 grains) krameria, in No. 40 powder, with sixty cubic centimeters (2 fluidounces) diluted alcohol for twenty-four hours; then pack it into a cylindrical percolator and percolate with diluted alcohol until three hundred grams (about 10 fluidounces) tincture has been obtained.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

KRAMERIÆ TROCHISCI; U. S.

Krameria Troches.

Mix thoroughly, by trituration, 6.50 grams (100 grains) extract of krameria, sixty-five grams (1,000 grains) finely powdered sugar, and 1.60 gram (25 grains) powdered tragacanth. Then add gradually sufficient orange-flower water, and work the mixture into a mass, which divide into one hundred troches.

Used in *chronic pharyngitis, relaxed uvula*, etc., in doses of one every hour or two.

Lac.

MILK.

Milch, G.; *Lait*, F.; *Leche*, Sp.; *Mjölk*, Sw.

Description.—The specific gravity of milk is 1.030. It contains four per cent. fixed oil (butter), 4.2 per cent. milk-sugar, about four per cent. albuminoids, and less than three-fourths per cent. of phosphates and chlorides.

Cream contains all of the butter and some of the albuminoids.

Skim-milk contains most of the albuminoids, the milk-sugar, and the salts.

Buttermilk contains the albuminoids, sugar, and salts of the milk, together with some lactic acid formed by the fermentation of the milk-sugar.

Condensed Milk.—This is made by adding sugar to milk and evaporating at a comparatively low temperature to the consistence of a soft extract, which is then put up in tin cans, afterward hermetically sealed. It keeps very well. Pharmacists sometimes use it for making "cream-syrup" for their soda-water fountains.

Condensed milk, properly diluted with warm water, is better for infants while teething or suffering from loose bowels than fresh cow's milk.

Uses.—A nutritious and unirritating food. By avoiding the presence of solid substances and restricting the patient to the use of milk, we give the various organs of digestion rest and allow a chance for the cure of inflammatory conditions.

Buttermilk is an excellent and refreshing drink in various diseases, especially in *dysentery.*

Ad libitum.

KOUMYS

is a fermented drink prepared from milk. The true original "koumys" is that made by the Russian Tartars from mare's milk. That article does not keep more than a week or two, and hence can be had only in Tartary, where it is all consumed.

Imitations of the true koumys are made by fermentation from cow's milk with the addition of milk sugar, grape sugar, and yeast, and are probably improvements upon the original. The preparation when ready for use contains about two to three per cent. alcohol, one-half to two per cent. lactic acid, and a little milk sugar, besides fat, casein, and salts. It has a sweetish, acidulous taste.

Uses.—It is diaphoretic, diuretic, and nutritive, and used in wasting diseases, such as phthisis, etc.

Dose.—*Ad libitum.*

Lacca Resina.

SHELLAC.

Lack, Gummilack, G.; *Gomme lacque, Lacque*, F.; *Gummilacca*, Sw.; *Lac.*

Origin and Habitat.—Lac is a resin which exudes from a number of East Indian trees when pierced by the insect Coccus lacca.

Description.—Shellac is in thin sheets or fragments of a yellowish-brown or brown color, transparent or translucid, insoluble in water, entirely soluble in alcohol, odorless and tasteless. The lighter in color the better.

Bleached, or *white shellac*, is obtained by treating the ordinary shellac with solvents, and afterward with chlorine or with sulphurous acid.

Used for making sealing-wax, varnish, etc.

Lactuca.

WILD LETTUCE.

Lactucæ Herba—Giftlattich, G.; *Laitue vireuse*, F.; *Lechuga*, Sp.; *Lactuk*, Sw.

Origin.—*Lactuca virosa*, Linné (*Compositæ*).

Habitat.—Europe.

Part used.—The flowering herb.

Description.—Has a branched stem, about one meter and over (from 3 to 6 feet) in height, pale green, often spotted, finally hollow. Leaves spirally arranged, light green, prickly on the under side over the veins. Flowers few, pale yellow. Odor narcotic, not very strong, but reminding of tobacco; taste bitter, saline.

Constituents.—The only important constituent is the mixed substance called *lactucarium*, which see.

Medicinal Uses.—Slightly soporific and anodyne. Seldom used except in the form of lactucarium.

LACTUCÆ EXTRACTUM.

EXTRACT OF LETTUCE.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

The Extract of Lettuce of the British Pharmacopœia is made as follows :

The fresh flowering herb is bruised in a stone mortar, the juice pressed out, heated gradually to 130° F., and the chlorophyll (or green coloring matter) is separated on a calico strainer. The strained liquid is heated to 200° F., to coagulate albumen, and is again strained. The filtrate is then evaporated to the consistence of thin syrup, to which is now added the chlorophyll previously separated, after which the whole is evaporated during constant stirring at not above 140° F. to a solid extract.

Greenish-brown. Yield about four per cent.

Dose.—0.1 to 5 grams (2 to 8 grains).

LACTUCÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF LETTUCE.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

Lactucarium; U. S.

LACTUCARIUM.

Lettuce Opium, E. ; *Giftlattichsaft*, G.

Origin.—*Lactuca virosa*, Linné; *Lactuca sativa*, Linné ; and *Lactuca scariola*, Linné (*Compositæ*).

Habitat.—Europe.

Character.—The hardened milk-juice of the plant.

Description.—In broken pieces, showing the form of the vessel in which the juice was collected to harden. This is *German lactucarium.* It is grayish-brown externally, and yellowish-white, waxy within ; less hard and brittle than the *English* (Scotch) lactucarium, which is of an earthy brownish color, and in irregular angular pieces. Both kinds are good lactucarium if they have the strongly bitter taste and opium-like narcotic odor which properly belong to the drug.

French lactucarium (*thridace*) is simply a blackish-brown extract of lettuce, obtained by the evaporation of the expressed juice of the plant. It is sometimes dry, but usually tough and sticky. It is very inferior, and should never be used as lactucarium.

Constituents.—There is no complete solvent for lactucarium, the

drug being a mixture of several substances differing widely in character. About one-half the weight of the drug is *lactucerin* (or *lactucon*), a tasteless substance, crystallizing in needles ; this is insoluble in water, but soluble in alcohol, ether, and oils, is probably inert, and resembles caoutchouc.

The medicinally important constituents of lactucarium are about three-tenths per cent. *lactucin*, which crystallizes in pearly scales, is a neutral principle, soluble in alcohol, insoluble in cold water, slightly soluble in boiling water, and has a persistently bitter taste ; *lactucopicrin*, which is amorphous, soluble in water and in alcohol, and extremely bitter ; and *lactucic acid*, also bitter, amorphous, but crystalline after long standing. There is also a minute quantity of volatile oil in lactucarium, having the odor of the drug.

Medicinal Uses.—Lactucarium is employed as an anodyne and soporific or hypnotic. It is much less efficient and certain in its effects than opium, in place of which it is given when the latter drug is not well tolerated ; but it possesses the advantages of being free from the unpleasant after-effects of the stronger drug. Lactucarium is generally used in the form of a syrup, as an addition to cough-mixtures.

The **dose** cannot be given with any degree of accuracy on account of the variable quality of the drug, but may be stated to be 0.5 to 4 grams (8 to 60 grains) for an adult, or 0.06 to 0.1 gram (1 to 2 grains) for a child of two years. The average dose for an adult is about one gram (15 grains).

LACTUCARII EXTRACTUM FLUIDUM ; U. S.

Fluid Extract of Lactucarium.

Macerate five hundred grams (or 17⅔ avoirdupois ounces) lactucarium, in No. 20 powder, for twenty-four hours with five hundred grams (17⅔ avoirdupois ounces, or about 23 fluidounces) ether in a weighed flask. Then add fifteen hundred grams (about 51 fluidounces) water and shake well. Fix a bent tube, by means of a perforated cork, tightly into the neck of the flask, place the flask in a vessel containing hot water, and let the ether distil over into a suitable receiver. Then remove the flask, shake the contents thoroughly, and continue heating for half an hour. Then let the liquid cool, add five hundred grams (17⅔ avoirdupois ounces, or nearly 21 fluidounces) of alcohol, and enough water to make the whole mixture weigh two thousand five hundred grams (88⅓ avoirdupois ounces). Macerate twenty-four hours again, shaking occasionally, after which express and filter the liquid. Evaporate this liquid to about two hundred grams (7 ounces 24 grains) and set

it aside. Put the residue back into the flask and macerate it with a mixture of two hundred and fifty grams (about 10½ fluidounces) of alcohol and seven hundred and fifty grams (about 25½ fluidounces) water. Express again, and repeat the maceration and expression two or three times, each time with the same quantities of alcohol and water, mixed as before, until the dregs are nearly tasteless. Mix all the macerates (except the two hundred grams of concentrated extract obtained by the evaporation of the first macerate), filter the mixture, and then evaporate it to one hundred grams (3 ounces 230 grains). Mix this with the two hundred grams before obtained, which was set aside. Add two hundred grams (8⅓ fluidounces) alcohol. Let the mixture cool in the evaporating dish, stirring often, but keeping the vessel closely covered when not stirring the contents. When cool, add enough alcohol to make the total weight of the mixture five hundred grams (17⅔ avoirdupois ounces). Pour it all into a bottle, and add enough water to make the whole measure five hundred cubic centimeters (17 fluidounces) using that small quantity of water to rinse the evaporating dish. Let the mixture stand six hours, shaking occasionally. If a portion of the precipitate should be tenacious the mixture must be shaken frequently. When a uniform mixture is obtained let it rest twenty-four hours to allow any precipitate to settle. Then decant the clear liquid, pour the sediment on a filter, let it drain thoroughly into the decanted clear liquid; wash the precipitate on the filter with a mixture of alcohol and water made in the proportion of seventy-five grams (3⅕ fluidounces) alcohol to each one hundred grams (3⅖ fluidounces) water, until the washings pass through tasteless. Evaporate the washings down to the consistence of syrup. Mix this with the decanted clear liquid, and add enough alcohol and water, mixed in the same proportions as for washing the precipitate, as just described, to make the whole product measure five hundred cubic centimeters (17 fluidounces). Let it stand twenty-four hours, stirring it occasionally. Then filter through paper.

The object of this elaborate process is to obtain a fluid extract of lactucarium which will mix clear with water, syrup, or glycerin, and we have found it to accomplish that end very well. The mixture of this fluid extract with simple syrup appears perfectly clear by transmitted light, and is only slightly opalescent by reflected light.

Each cubic centimeter represents one gram of lactucarium; each fluidounce represents four hundred and fifty-five and two-thirds grains; and each fluidrachm nearly fifty-seven grains.

The **dose** is 0.12 to 1.25 cubic centimeter (2 to 20 minims), according to age. It is used mainly for preparing the syrup and the glycerole of lactucarium.

LACTUCARII GLYCERITUM.

GLYCERITE OF LACTUCARIUM.

Glycerole of Lactucarium.

Made as the syrup of lactucarium, except that glycerin is used instead of the simple syrup.

Dose.—Eight to twelve cubic centimeters (2 to 3 fluidrachms).

LACTUCARII SYRUPUS; U. S.

SYRUP OF LACTUCARIUM.

Mix fifteen cubic centimeters (½ fluidounce) fluid extract of lactucarium with two hundred and twenty-five cubic centimeters (or 7½ fluidounces) simple syrup.

Slightly opalescent by reflected light.

Dose.—Eight to twelve cubic centimeters (2 to 3 fluidrachms).

Laminaria.

LAMINARIA.

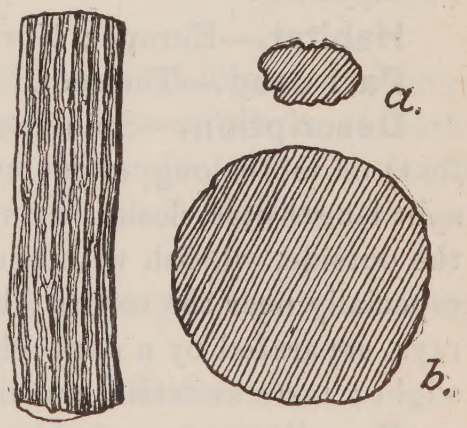
Laminariæ Stipites—Sea-Tangle.

Origin.—*Laminaria digitata*, Lamour (*Algæ*).

Habitat.—Along the coasts of the Atlantic Ocean.

Part used.—The stem.

Description.—Olive-brown, without joints or branches, fifty to two hundred centimeters (2 to 7 feet) long, several millimeters thick; coarsely wrinkled longitudinally; cylindrical, somewhat flattened; elastic or horny; usually covered with a thin film of salt. When soaked in water it swells, assumes a cartilaginous consistence and about four times its previous diameter.



FIGS. 353–355.—Laminaria, a short piece, natural size. *a*, transverse section, dry; *b*, transverse section, after soaking in water.

Sea-tangle tents are made from laminaria by trimming it down to tapering pieces of various lengths and diameters. These swell proportionally even more than the laminaria itself, on account of the removal of the outer membrane, which in the unpeeled laminaria arrests further enlargement as soon as the original natural size is reached.

Sea-tangle tents are used like sponge-tents to dilate various openings, sinuses, etc., but mainly in gynæcological practice to dilate the mouth of the womb.

Lappæ Fructus.

LAPPA FRUIT.

Burdock Seed.

Origin and Habitat.—See Lappæ Radix.

Description.—The achenes or fruits of Lappa officinalis are oblong, flattened, transversely wrinkled, about six millimeters ($\frac{1}{4}$ inch) long, and three millimeters ($\frac{1}{8}$ inch) wide, grayish-brown; pappus short, composed of numerous rough separate bristles, which generally fall off when the fruit is collected. Odor none; taste bitter.

Constituents.—Fixed oil, resin, some bitter principle, etc.

Medicinal Uses.—This substance has been highly recommended in *chronic* or *inveterate psoriasis*, and as a bitter tonic in *atonic dyspepsia*. Best given in the form of FLUID EXTRACT, made with diluted alcohol as a menstruum, of which the

Dose is one to four cubic centimeters (15 to 60 minims).

Lappæ Radix.

LAPPA ROOT.

Bardanæ Radix—Klettenwurzel, G.; *Bardane*, F.; *Bardana*, Sp.; *Kardborrerot*, Sw.; *Burdock Root.*

Origin.—*Lappa officinalis*, Allioni, and other species of *Lappa* (*Compositæ*).

Habitat.—Europe; North America.

Part used.—The root.

Description.—Spindle-shaped, nearly simple, three decimeters (a foot) or more long, about twenty-five millimeters (1 inch) thick, often split lengthwise, fleshy, wrinkled longitudinally, dark grayish-brown on the outside, whitish within, usually showing cavities in the parenchyma, especially near the centre; bark thick, internally whitish with brownish rays, separated by a dark circle (cambium line) from the wood. Odor slight; taste sweetish, mucilaginous, bitter.

Constituents.—A bitter principle, mucilage, sugar, inulin, and a little tannin, together with traces of volatile oil.

Medicinal Uses.—Similar to those of sarsaparilla in *chronic skin diseases*, *rheumatism*, etc. Externally, in poultices or fomentations to *chronic sores*, *hemorrhoids*, and *swellings*. Best given in the form of FLUID EXTRACT, made with diluted alcohol as a menstruum, of which the

Dose is five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

Laurocerasus.

CHERRY-LAUREL.

Laurocerasi Folia—Kirschlorbeerblätter, G.; *Feuilles de laurier-cerise*, F.

Origin.—*Prunus Laurocerasus*, Linné (*Rosaceæ*).

Habitat.—Cultivated in Southern Europe.

Part used.—The fresh leaves.

Description.—Oblong, acute, sharply serrate at long intervals. On the under surface there are from one to three pairs of depressed glands near the base of the leaf. When bruised the leaves emit a bitter-almond odor; the taste is aromatic, bitter.

Constituents.—*Laurocerasin* — a compound of amygdalin and amygdalic acid—which, when isolated, is an amorphous white powder; it forms hydrocyanic acid by the action of emulsin in the presence of water, a volatile oil (consisting of benzaldehyd) resembling oil of bitter almond being formed at the same time. Hence, when fresh cherry-laurel leaves are bruised and macerated with water, and then distilled, a distillate containing hydrocyanic acid is obtained.

Medicinal Uses.—The action depends on the hydrocyanic acid produced as just described. The drug is given only in the form of cherry-laurel water. Externally the bruised leaves are sometimes applied to relieve *pain*, *itching*, etc.

LAUROCERASI AQUA.

CHERRY-LAUREL WATER.

Cut and bruise twelve hundred grams (42 ounces 140 grains) cherry-laurel leaves; add one hundred and twenty cubic centimeters (4 fluidounces) alcohol, and three thousand six hundred cubic centimeters ($7\frac{2}{3}$ pints) water. Introduce the mixture into a still, and distil off one liter (34 fluidounces) of product.

Contains volatile oil of bitter almond and hydrocyanic acid, and is of about the same strength as bitter-almond water.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Lauri Baccæ.

LAUREL BERRIES.

Lorbeer, G.; *Fruits de Laurier*, F.; *Lagerbär*, Sw.; *Bayberries.*

Origin.—*Laurus nobilis*, Linné (*Lauraceæ*).

Habitat.—Southern Europe.

Description.—Brittle drupes, about eight to twelve millimeters ($\frac{1}{3}$ to $\frac{1}{2}$ inch) long, elliptic, oval, or round, externally olive-green or

blackish-brown, irregularly finely wrinkled. The embryo lies loose in the large cavity formed by the shell, which consists of all the other parts of the fruit. Odor aromatic ; taste bitter, aromatic.

Constituents.—About one-fourth per cent. volatile oil, one per cent. laurel camphor, twelve per cent. liquid fixed oil, contained in the fleshy part, thirty per cent. solid fixed oil (laurostearin), and twenty-six per cent. starch. The laurel camphor (*laurin*) forms colorless and odorless but bitter crystals, readily soluble in boiling alcohol or ether.

Medicinal Uses.—Stimulant and stomachic. Seldom used.

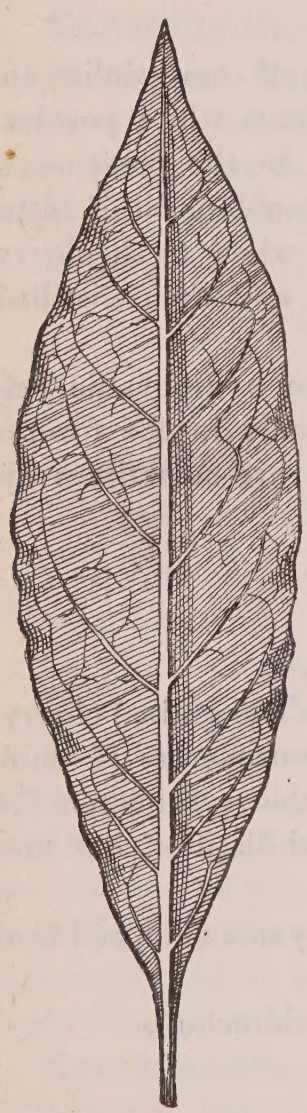


Fig. 356.—Laurel Leaf, natural size.

Lauri Baccarum Ætheroleum.

Volatile Oil of Laurel Berries.

Volatile Oil of Bayberries.

Pale straw-colored, or colorless when fresh, has the odor of the fruit and a bitter taste. It has 0.88 specific gravity, and solidifies already at 12° C. (54° F.). It consists of a camphene and eugenic acid. Occasionally employed externally in *rheumatism*, etc.

Lauri Folia.

Laurel Leaves.

Bay-Leaves, Bay-Laurel Leaves.

Origin.—*Laurus nobilis*, Linné (*Lauraceæ*).

Habitat.—Southern Europe.

Description.—See the figure. They have short stalks, are leathery, glossy, finely veined on the under side, marked by pellucid dots (oil glands), brownish-green, of agreeable aromatic odor, and bitter taste.

Constituents.—Volatile oil, some bitter substance, and tannin.

Uses.—Employed in cooking for flavoring.

Lauri Oleum Expressum.

Fixed ("Expressed") Oil of Bayberries.

Prepared by boiling the crushed fruit with water, and expressing. It has the consistence of a soft ointment, is granular from crystals of

laurostearin, and has a fine green color from chlorophyll. Entirely soluble in ether. Alcohol extracts from it some volatile oil and the chlorophyll. The oil is a mixture of a liquid and a solid fixed oil, volatile oil, and laurel camphor. It has the odor and taste of the drug.

Used in ointments.

LAURI UNGUENTUM.

LAUREL SALVE.

Melt three hundred and fifty grams (12 ounces 150 grains) suet, and add to it twenty grams (310 grains) rectified oil of amber, forty-five grams (1 ounce 257 grains) oil of turpentine, and five hundred and eighty-five grams (20 ounces 280 grains) fixed oil of bayberries.

For external use in *rheumatism*, etc.

Lavandula; U. S.

LAVENDER.

Lavandulæ Flores—Lavendelblüthe, G.; *Fleurs de Lavande*, F.; *Lavendel-blommor*, Sw.

Origin.—*Lavandula vera*, De Candolle (*Labiatæ*).

Habitat.—Cultivated.

Part used.—The flowers only.

Description.—Small; blue-gray tubular calyx; violet-blue corolla; odor fragrant; taste aromatic, camphoraceous, bitterish.

Constituents.—From one to three per cent. volatile oil, and some resin and tannin.

Properties.—Stimulant, carminative. Seldom used internally, except as a flavoring agent.

Lavandulæ Florum Oleum; U. S.

OIL OF LAVENDER FLOWERS.

Lavandulæ Florum Ætheroleum — Volatile Oil of Lavender Flowers.

The volatile oil distilled from the fresh flowers of *Lavandula vera.*

Description.—See the Pharmacopœia, page 238.

This is far superior to the "oil of garden lavender," and the still poorer "oil of spike lavender." But there are still several grades and kinds even of the volatile oil of lavender flowers. That obtained from the flowers grown at Mitcham, in England, is very fine, and so is the Dauphin oil of lavender from France (Grasse); but the two are sufficiently different and distinct not to permit their indiscriminate use, one for the other, in perfumery.

Carminative in **doses** of four to five drops.

LAVANDULÆ SPIRITUS; U. S.

SPIRIT OF LAVENDER.

Mix thirty grams (1 ounce 25 grains) oil of lavender flowers and nine hundred and seventy grams (40½ fluidounces) alcohol.

The product measures about forty-two fluidounces.

Dose.—Two to four cubic centimeters (½ to 1 fluidrachm).

LAVANDULÆ SPIRITUS COMPOSITUS.

COMPOUND SPIRIT OF LAVENDER.

This preparation is now properly named Tinctura Lavendulæ Composita. (See below.)

Lavandulæ Oleum; U. S.

OIL OF LAVENDER.

Lavandulæ Ætheroleum — Volatile Oil of Lavender, Oil of Garden Lavender.

This is the volatile oil distilled from the whole plant or the flowering tops of *Lavandula vera.* It is much coarser than the oil of lavender flowers.

Its odor should not be terebinthinous.

A very inferior, greenish-colored, turpentine-like oil of spike lavender is distilled from *Lavendula spica,* Chaix., and *Lavendula stœchas,* Linné.

Description.—See the Pharmacopœia, page 238.

Carminative in **doses** of four to five drops.

LAVANDULÆ TINCTURA COMPOSITA; U. S.

COMPOUND TINCTURE OF LAVENDER.

Spiritus Lavendulæ Compositus, Phar. 1870.

Mix eighteen grams (278 grains) cinnamon, four grams (62 grains) cloves, ten grams (154 grains) nutmeg, and eight grams (123 grains) red saunders, and reduce all to No. 20 powder.

Dissolve eight grams (123 grains) oil of lavender, and two grams (31 grains) oil of rosemary in six hundred and eighty grams (24 ounces, or about 28½ fluidounces) alcohol.

Moisten the powdered drugs with the alcoholic solution of the volatile oils; pack the moistened powder tightly in a cylindrical percolator, and percolate first with the remainder of the alcoholic liquid and afterward with diluted alcohol until one thousand grams (35 ounces 120 grains, measuring about 42 fluidounces) of tincture has been obtained.

It is to be regretted that the Pharmacopœia prescribes the use of the volatile oil of the herb instead of the volatile oil of the flowers in this preparation.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Ledum.

LEDUM.

Ledi Herba—Sumpf-forst, Wilder Rosmarin, G.; *Lédon, Romarin sauvage*, F.; *Squattram, Pors*, Sw.; *Marsh Tea, Wild Rosemary.*

Origin.—*Ledum palustre*, Linné (*Ericaceæ*).

Habitat.—Northern countries.

Parts used.—The small branches, tops, and leaves, gathered when the flowers are half developed.

Description.—The small branches of the bush are covered by rust-brown wool, and provided with oil-glands. The leaves are about twenty-five millimeters (1 inch) long, linear, leathery, wrinkled above, glandulous, hairy along the midrib, on the underside clothed with brown wool, covered with numerous glands, and showing the midrib prominently. The flowers are white, or pale yellowish after drying. Odor strongly aromatic, heavy ; taste camphoraceous, bitter.

The drug must not contain any fruit, not even partly formed.

Constituents.—Volatile oil, valerianic acid, *ericolin*, leditannic acid, resin, etc.

Medicinal Uses.—Said to be acrid-narcotic. Has been used in *diarrhœa, dysentery, gout, rheumatism*, and *chronic skin diseases.* Also used externally to destroy *parasites.*

Dose.—One to two grams (15 to 30 grains), in infusion, every two or three hours.

Leonurus.

LEONURUS.

Leonuri Herba—Motherwort.

Origin.—*Leonurus cardiaca*, Linné (*Labiatæ*).

Habitat.—Northern hemisphere.

Part used.—The flowering tops and leaves.

Description.—Quadrangular stem, lower leaves round, sometimes heart-shaped at the base, five- or seven-lobed ; upper leaves oblong, pointed, three-lobed, wedge-shaped at the base. Flowers pale purplish. Odor aromatic, disagreeable ; taste bitter.

Constituents.—Volatile oil, and some bitter substance not known.

Medicinal Uses.—Motherwort is stated to be emmenagogue, ner-

vine, and antispasmodic, and to be useful in *amenorrhœa* and *dysmenorrhœa*, due to exposure to cold, and to promote *suppressed lochial discharges*. It is furthermore used in *nervous* and *hysterical pains*, and complaints peculiar to females.

Best given in the form of FLUID EXTRACT, prepared with diluted alcohol as a menstruum, of which the

Dose is two to four cubic centimeters (30 to 60 minims).

Leptandra; U. S.

LEPTANDRA.

Leptandræ Radix—Culver's Root, Black Root, Culver's Physic, E.

Origin.—*Leptandra virginica*, Nuttall (*Scrophulariaceæ*).

Habitat.—North America.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 190.

Constituents.—A bitter principle called *leptandrin* (Wayne), which is not the eclectic preparation of that name; also about six per cent. of resin, saponin, tannin, etc.

The eclectic *leptandrin* is an alcoholic extract.

Medicinal Uses.—Laxative, tonic, and cholagogue. Used in *hepatic troubles*, *diarrhœa*, and *dysentery*, to alter the character of the stools.

Dose.—One to four grams (15 to 60 grains), best given as fluid extract.

LEPTANDRÆ EXTRACTUM; U. S.

EXTRACT OF LEPTANDRA.

As a *first menstruum* use a mixture of one thousand grams (41¾ fluidounces) of alcohol and five hundred grams (17 fluidounces) of water. Moisten five hundred grams (17⅔ avoirdupois ounces) of leptandra, in No. 60 powder, with two hundred grams (about 8 fluidounces) of the first menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate to exhaustion or until one thousand five hundred grams (about from 56 to 60 fluidounces) of total percolate has been received. Distil off the alcohol and evaporate the remainder to a solid extract. Add to it while still warm one-twentieth of its weight of glycerin, and mix thoroughly.

Brown. New to the Pharmacopœia.

Practically the same product is obtained by evaporating the fluid extract to the pilular consistence, and then incorporating five per cent. of glycerin.

Dose.—0.05 to 0.10 gram (1 to 2 grains) three times a day.

LEPTANDRÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF LEPTANDRA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅖ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 8 fluidounces) of the menstruum. Pack it moderately in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Levistici Fructus.

LEVISTICUM FRUIT.

Lovage Seed.

Origin, etc.—See *Levistici Radix.*

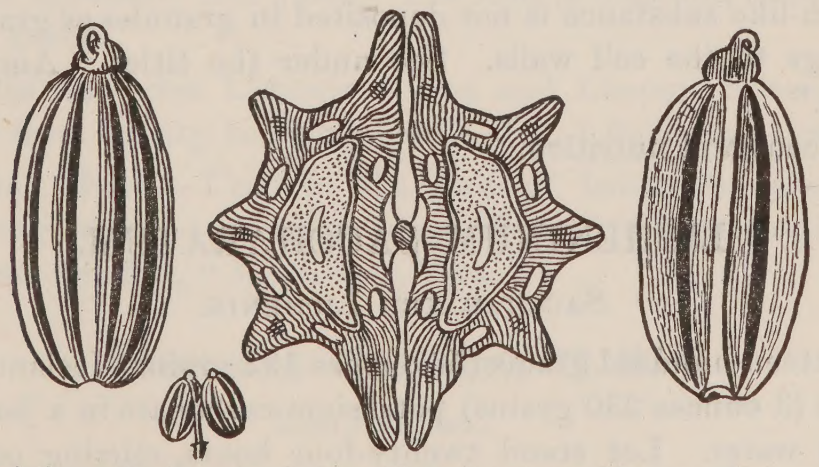


FIG. 357.—Levisticum Fruit, natural size, enlarged outer and inner surface, and transverse section enlarged.

Flattened, elliptic, yellowish-brown, aromatic; contains a volatile oil, and is sometimes used as a stimulant carminative.

Levistici Radix.

LEVISTICUM ROOT.

Liebstöckel, G.; *Livèche*, F.; *Libsticka*, Sw.; — *Lovage.*

Origin.—*Levisticum officinale*, Koch (*Umbelliferæ*).

Habitat.—Europe; cultivated in Germany.

Description.—The main root is ten centimeters (4 inches) or less long, and about four centimeters ($1\frac{3}{5}$ inch) thick, marked by transverse rings; usually split lengthwise; branches few, deeply wrinkled, long, soft, spongy, flexible. Bark light, yellowish-brown externally; middle bark whitish; wood yellowish, indistinctly radiated. Oil ducts few, scattered. Odor peculiar, strongly aromatic, reminding of angelica; taste sweetish, aromatic, bitter.

The nearly allied *Ligusticum actæifolium*, "Southern Angelica," is frequently sold as *angelica*, but is very much lighter in color.

This drug is frequently attacked by insects.

Constituents.— *Volatile oil*, *resin*, and *bitter extractive.*

Medicinal Uses.—Stimulant, carminative, and stomachic.

Dose.—One to five grams (15 to 75 grains) several times a day in decoction.

Licheninum.

LICHENIN.

Lichen Starch.

A peculiar starch contained in Iceland moss and in other lichens. This starch-like substance is not deposited in granules as grain starches, but belongs to the cell walls. See under the titles "Amylum" and "Cetraria."

Demulcent and nutritive.

LICHENINUM SACCHARATUM.

SACCHARATED LICHENIN.

Put sixteen hundred grams (56 ounces 192 grains) Iceland moss and 100 grams (3 ounces 230 grains) potassium carbonate in a jar and cover them with water. Let stand twenty-four hours, stirring occasionally. Pour off the liquid, and then wash the lichen by affusion and decantation of water until the alkaline and bitter taste is wholly removed. Boil the washed lichen with twenty liters (42 pints) water for four hours. Strain. Boil the residue once more with a fresh quantity of

water and strain again. Mix the colatures. Add six hundred grams (or about 21 ounces) sugar, and evaporate until the mass is tough and no longer adhesive. Then pull it into sticks and dry it. Weigh the dried product, and add to it enough sugar to make the total amount of sugar in the final product equal to the weight of the dried sticks, less six hundred grams (the sugar previously added). Powder.

The preparation is to contain equal parts by weight of dried jelly and sugar.

Dose.—*Ad libitum.*

Limon; U. S.

LEMON.

Limone, G.; *Citron*, F.; *Limon*, Sp.; *Citron*, Sw.

Origin.—*Citrus Limonum*, Risso (*Aurantiaceæ*).

Habitat.—Cultivated in sub-tropical countries.

Part used.—The fresh fruit.

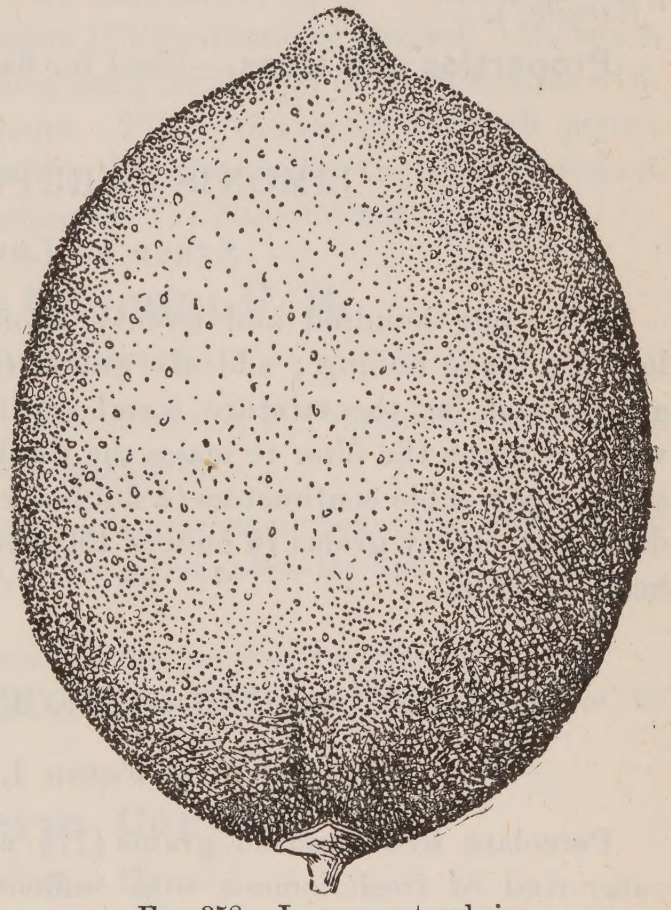


FIG. 358.—Lemon, natural size.

Description.—Oval, bright yellow, with nipple-shaped apex, glandulous rind; containing an agreeably acid juice. The rind is fragrant, bitter. Must be fresh and sound.

Constituents.—See Limonis Cortex and Limonis Succus. Each lemon yields from twenty to thirty grams ($\frac{2}{3}$ to 1 fluidounce) of juice.

Medicinal Uses.—Used in the form of lemonade as a cooling drink to assuage thirst and reduce *feverishness*. Antiscorbutic. Also used in *hepatic troubles*, "*biliousness*," etc.

Limonis Cortex; U. S.

LEMON-PEEL.

Citronenschale, Limonenschale, G.; *Écorce de citron, Zeste de limon*, F.; *Citronskal*, Sw.

Part used.—The rind of the fresh lemon.

Description.—See the Pharmacopœia, page 190.

Constituents.—Volatile oil (oil of lemon) and a bitter substance called *hesperidin.*

Quartered Lemon-Peel, with a thick, white, fleshy layer on the inner surface, is often met with in the trade, and is inferior, as the volatile oil is only found in the external thin yellow glandulous layer (the "*flavedo*").

Properties and Uses.—Used for flavoring purposes only.

LIMONIS SYRUPUS; U. S.

SYRUP OF LEMON.

Heat one hundred and twenty cubic centimeters (4 fluidounces) lemon juice to boiling; add six grams (92 grains) lemon-peel, freshly grated, and let the mixture stand until cool. Filter, adding enough water through the filter to make the total filtrate measure one hundred and twenty cubic centimeters (4 fluidounces). In this dissolve one hundred and eighty grams (6 ounces 150 grains) sugar without the use of heat. Strain.

LIMONIS CORTICIS RECENTIS TINCTURA.

TINCTURE OF FRESH LEMON-PEEL.

Percolate five hundred grams (17⅔ avoirdupois ounces) of grated outer rind of fresh lemons with sufficient alcohol to obtain one liter (34 fluidounces) of tincture.

This is used for flavoring elixirs, wines, tinctures, syrups, etc., for which purpose it is very useful.

Limonis Oleum; U. S.

OIL OF LEMON.

Limonis Ætheroleum — Volatile Oil of Lemon.

Expressed volatile oil from fresh lemon-peel.

For **description** and mode of **preservation,** see the Pharmacopœia, page 228.

"Expressed" volatile oil of lemon ("zeste") is much superior to the "distilled."

Must have a neutral reaction. Should be kept in tightly corked bottles in a cool, dark place.

LIMONIS SPIRITUS; U. S.

SPIRIT OF LEMON.

Essence of Lemon.

Mix thirty cubic centimeters (1 fluidounce) oil of lemon and four hundred and fifty cubic centimeters (15 fluidounces) alcohol. Macerate twenty grams (300 grains) of the grated outer rind of fresh lemons with the mixture for twenty-four hours. Filter the liquid through paper, adding enough alcohol through the filter to make the whole product measure five hundred cubic centimeters (17 fluidounces).

Limonis Succus; U. S.

LEMON JUICE.

Citronensaft, Limonensaft, G.; *Suc de citron*, F.; *Zumo de limon*, Sp.; *Citronsaft*, Sw.

Description.—Lemon juice is a somewhat unclear thin juice, nearly colorless or very pale yellowish, of an agreeable odor and acid taste.

Must be quite fresh.

Constituents.—From seven to nine per cent. citric acid.

Medicinal Uses.—Same as of citric acid, but is more pleasant to the taste.

Linderæ Cortex.

LINDERA BARK.

Spicebush Bark, Feverbush Bark, Wild Allspice Bark.

Origin.—*Benzoin odoriferum*, Nees (*Lauraceæ*).

Habitat.—North America.

Description.—Thin quills or troughs, which are externally dark brown, dotted, glossy, and warty; inner surface smooth, light brown. Has a pleasant odor, and an aromatic, pungent, and astringent taste.

Constituents.—Volatile oil and resin.

Nomenclature.—We have chosen the generic botanical name given by Meissner for this plant as the pharmacological name, in order to avoid confusion between this drug and the balsamic resin from styrax benzoin.

Medicinal Uses.—Aromatic, stimulant, and tonic. A hot weak infusion is also diaphoretic, and may be taken *ad libitum*.

Best given in the form of FLUID EXTRACT, made with alcohol as a menstruum, of which the **dose** is two to five cubic centimeters (30 to 75 minims).

Linderæ Fructus.

LINDERA BERRIES.

Spicebush Berries, Feverbush Berries, Wild Allspice Berries.

Origin, etc.—See p. 651.

Description.—Oval, with a circular scar from the stem, nearly ten millimeters (⅜ inch) long, externally dark-brown and rough. Contains a large white seed. Odor fragrant. Taste pungent, aromatic.

Constituents.—Fragrant volatile oil.

Medicinal Uses.—Action similar to that of the bark. The oil is used in *flatulent colic* as a carminative. The berries have been used as a spice.

Linimenta.

LINIMENTS.

Usually mixtures of fixed oils with volatile oils, or with alcoholic solutions of powerful remedies. They are liquid or semi-liquid. Sometimes they do not contain any fixed oil. There are ten liniments in the new Pharmacopœia.

Liniments are used externally in painful rheumatic affections, glandular swellings, enlarged joints, etc. Sometimes they are simply intended to facilitate massage or the kneading of the affected parts by the hands.

Linum; U. S.

FLAXSEED.

Linseed, E.; *Leinsamen, Flachssamen*, G.; *Semences de lin*, F.; *Linaza, Semilla de lino*, Sp.; *Linfrö*, Sw.

Origin.—*Linum usitatissimum*, Linné (*Linaceæ*).

Habitat.—Cultivated.

Part used.—The seed.

Description.—About four millimeters (⅙ inch) long, oval, flattened, brown, glossy; swelling in water; internally yellowish-white; inodorous, mucilaginous, oily, disagreeable.

Constituents.—About fifteen per cent. of mucilage is contained in the epithelium, or external coat; there is from thirty to nearly forty per cent. fixed oil in the embryo or inner portion of the seed.

Medicinal Uses.—Demulcent and emollient. The virtue of the infusion of linseed depends mainly upon the warm water of the tea. It is sometimes used in *bronchial* and *renal inflammations*, and is given *ad libitum*.

LINI FARINA.

FLAXSEED MEAL.

Linseed Meal, Ground Flaxseed.

Description.—Freshly prepared ground flaxseed is the only kind to be used. It is oily, soft, of a pure, fresh linseed oil odor, and should yield at least twenty-five per cent. linseed oil to bisulphide of carbon. Flaxseed meal made by means of rollers is very satisfactory; that made in mills which cut is harsh to the feel, and does not make so good a poultice. Mixed with warm water it forms an excellent emollient poultice, useful in *inflammations*, *forming abscesses*, and as a protective in *burns*, etc. It promotes suppuration. Large warm flaxseed poultices to cover the entire chest or abdomen are often of marked benefit in *pleuritis*, *pneumonia*, or *peritonitis*.

LINI CATAPLASMA.

LINSEED POULTICE.

Stir two hundred and forty grams (8 ounces) of flaxseed meal gradually into three hundred cubic centimeters (10 fluidounces) of boiling water, and then incorporate thirty cubic centimeters (1 fluidounce) of olive oil.

LINI INFUSUM.

INFUSION OF FLAXSEED.

From thirty grams (about 1 avoirdupois ounce) of the whole drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—*Ad libitum.*

Lini Oleum; U. S.

OIL OF FLAXSEED.

LINSEED OIL.

Cold-pressed linseed oil is the kind prescribed.

Description.—See the Pharmacopœia, page 238. It dries to a transparent yellowish mass. When recently made by cold expression the oil is light colored, thin, and has no disagreeable odor or taste. Must not be dark, nor have a strong disagreeable odor.

Constituents.—Chiefly linolein.

Uses.—Seldom employed internally, but more often externally in liniments, etc.

Linteum.

LINT.

"Patent Lint."

This is a textile fabric of loose texture, in which the warp is linen and the woof cotton ; it is soft and woolly on one side.

Used as a dressing to wounds, being usually first covered with cerate.

Liquidambar.

LIQUIDAMBAR.

Sweet Gum.

Origin.—*Liquidambar styraciflua*, Linné (*Hamamelaceæ*).

Habitat.—North and Central America.

Description.—A thick, brownish-yellow balsam, or a resin which softens from the warmth of the hand. Odor agreeable, reminding of storax ; taste aromatic, bitterish, pungent.

Soluble in alcohol, ether, and chloroform, leaving only mechanical impurities undissolved.

Constituents.—Three and one-half per cent. styrol, five per cent. cinnamic acid, styracin, and resin.

Uses.—This domestic drug, when used at all, is used in the same manner and for the same purposes as storax, tolu, and benzoin. It certainly deserves to be used more than the other balsams just named, because it is a domestic product ; but we fear that it is neglected chiefly because it is not imported.

We Americans ought to follow the example of our English cousins in the matter of using our own drugs in preference to imported ones. If we do not use them ourselves no one else will, no matter how valuable they may be.

Liquores.

SOLUTIONS.

Solutiones.

The official "liquores" are, with one exception, solutions of solids in water. The exception is the liquor guttæ perchæ. It is to be regretted that the pharmacopœial nomenclature still remains imperfect in so many little things, where the most trifling changes would at once remove the obstacles in the way of the adoption of clearly definitive general titles for clearly distinct and harmonious groups of pharmaceutical

preparations. A systematic nomenclature is one of the most valuable aids to intelligent pharmacy. If the art of pharmacy is to be at all scientific, if we are not merely cooks or shopkeepers, let us at least be systematic and orderly, even if it occasions such inconveniences as taking liquor guttæ perchæ out of the group of aqueous solutions or solids, where it does not belong, and giving it a new name, such as collodium guttæ perchæ, or whatever may be deemed most intelligible and appropriate.

Liriodendron.

LIRIODENDRON.

Liriodendri Cortex—Whitewood, Tulip-Tree Bark.

Origin.—*Liriodendron tulipifera*, Linné (*Magnoliaceæ*).

Habitat.—United States.

Part used.—The bark of the younger branches.

Description.—Quills or troughs about two millimeters ($\frac{1}{12}$ inch) thick; purplish-brown, or blackish externally, with thin ridges, frequently cleft so as to form meshes; smooth, whitish on the inner side; fracture fibrous; inodorous; taste astringent, pungent, bitter.

Bark from older branches is not so good, being less pungent.

Constituents.—Tannin, resin, and *liriodendrin*, which is a white, crystalline, pungent, neutral principle, soluble in alcohol and in ether.

Medicinal Uses.—Bitter tonic.

Best given in the form of FLUID EXTRACT, made with alcohol as a menstruum, of which the **dose** is four to eight cubic centimeters (1 to 2 fluidrachms).

Lithium.

LITHIUM.

A silver-white metal resembling potassium and sodium. It is the lightest of all metals, and floats on petroleum.

Its salts resemble those of potassium and sodium, but are not as readily soluble, and color the spirit-lamp or blow-pipe flame beautifully crimson.

Lithium salts are used in medicine chiefly on account of the low atomic weight of the metal, which makes its saturating power greater than that of the other alkali metals. Benzoate, bromide, chloride, citrate, and salicylate are soluble; the carbonate and the hydrate dissolve only to a very limited extent.

Lithii Benzoas ; U. S.

BENZOATE OF LITHIUM.

Lithicus Benzoas—Lithium Benzoate.

Contains about ninety-five per cent. benzoic acid.

White, granular or in scales. Either odorless or of an agreeable weak odor of benzoin. Taste sweetish, cooling. Soluble in four times its weight of cold water and in less boiling water ; also in about twelve parts alcohol.

Medicinal Uses.—Both lithium and benzoic acid separately are antilithic, and the resulting salt should, therefore, on theoretical grounds, be especially valuable. We are not, however, prepared to assert this to be an established fact. The uses are similar to those of citrate of lithium.

Dose.—0.1 to 0.5 gram (2 to 8 grains).

Lithii Bromidum ; U. S.

BROMIDE OF LITHIUM.

Lithicum Bromidum—Lithium Bromide.

Contains over ninety-two and a half per cent. bromine.

Granular, white, deliquescent, odorless, of a sharp, bitter, salty taste. Freely soluble in water and in alcohol.

Must be kept in tightly closed bottles.

Medicinal Uses.—Similar to those of citrate of lithium. Antilithic, also used like other alkaline bromides in *epilepsy.*

Dose.—0.05 to 0.5 gram (1 to 10 grains).

Lithii Carbonas ; U. S.

CARBONATE OF LITHIUM.

Lithicus Carbonas—Lithium Carbonate.

A light, white powder ; inodorous, alkaline. Requires one hundred and thirty times its own weight of water to dissolve it. Insoluble in alcohol.

One hundred grains of lithium carbonate has the same saturation power relative to acids as two hundred and twenty-seven grains of sodium bicarbonate. As an antacid, therefore, the lithium carbonate has more than twice the power of the sodium bicarbonate.

Medicinal Uses.—Similar if not identical with those of citrate of lithium, as an antilithic.

Dose.—0.05 to 0.4 gram (1 to 6 grains).

Lithii Citras; U. S.

CITRATE OF LITHIUM.

Lithicus Citras—Lithium Citrate.

White, deliquescent, crystalline, odorless, of a somewhat salty taste, and neutral reaction. Soluble in five and one-half times its weight of water.

Must be kept in well-closed bottles.

Medicinal Uses.—Antilithic. Used in *gout*, and to dissolve *acid urinary concretions* in the kidneys or bladder.

Dose.—0.05 to 0.5 gram (1 to 10 grains).

Lithii Salicylas; U. S.

SALICYLATE OF LITHIUM.

Lithicus Salicylas—Lithium Salicylate.

Contains a trifle over ninety per cent. salicylic acid.

White, amorphous, deliquescent, odorless, sweetish, faintly acid. Freely soluble in water and in alcohol.

Medicinal Uses.—Rich in salicylic acid and may be used whenever this substance is indicated.

Dose.—0.1 to 0.5 gram (2 to 8 grains).

Litmus.

LITMUS.

Lacca Cœrulea, Lacca Musica—*Lackmus*, G. and Sw.; *Tournesol, Laque Bleu*, F.

A blue pigment prepared from *Roccella tinctoria*, and other lichens.

Occurs in small rectangular cakes, friable, indigo blue, of a violet odor, and somewhat saline, pungent taste. It imparts its coloring matter (*orcein*) to water, and still more readily to alcohol. As it always contains chalk it effervesces with acids.

LITMUS TINCTURA.

TINCTURE OF LITMUS.

Triturate and dissolve thirty grams (1 ounce) litmus in three hundred cubic centimeters (10 fluidounces) diluted alcohol (1880). Filter.

BLUE LITMUS PAPER.

BLUE TEST-PAPER.

Dip pieces of white unsized paper in tincture of litmus and then dry. Acids and acid salts turn blue test-paper red.

RED LITMUS PAPER.

RED TEST-PAPER.

Add very carefully, drop by drop, a minute quantity of diluted hydrochloric acid to tincture of litmus until it just turns red. Dip pieces of white, unsized paper in the reddened solution, and then dry.

Alkalies and alkaline salts turn red test-paper blue.

NEUTRAL LITMUS PAPER.

NEUTRAL TEST-PAPER,

Which will show both reactions for acid and for alkali, may be made as follows: Boil thirty grams (1 ounce) litmus in two hundred and twenty-five cubic centimeters (7½ fluidounces) water about twenty minutes, adding more water as required to make up for loss by evaporation. Divide the solution into two equal portions. Add to one of these portions, drop by drop, enough hydrochloric acid to barely turn the liquid red. Then add to it the other portion. Unsized white paper is slowly passed through the liquid, and then hung up to dry.

Lobelia; U. S.

LOBELIA.

Lobelia Herba—Indian Tobacco.

Origin.—*Lobelia inflata*, Linné (*Lobeliaceæ*).

Habitat.—North America.

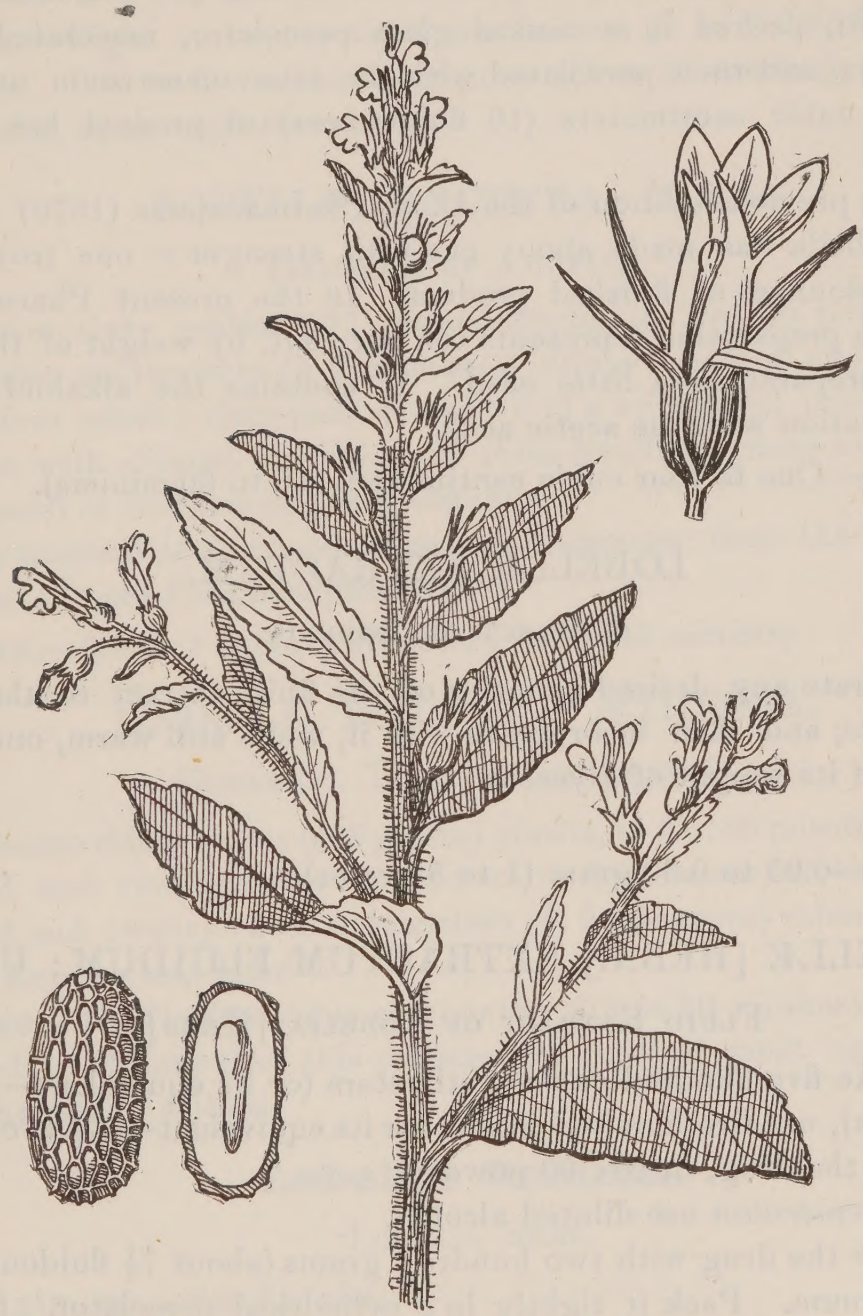
Parts used.—The official drug consists of the leaves and tops, collected after the seed-capsules have become inflated.

Description.—See Fig. 355. The herb is pale green, has a slight odor, and a burning tobacco-like taste when chewed. The powder is very irritating to the air-passages.

Constituents.—The alkaloid *lobeline* is doubtless the active constituent. In the drug it is combined with lobelic acid. It is a light yellow, oily liquid, having a somewhat aromatic odor and a burning,

acrid, tobacco-like taste ; soluble in alcohol and in ether. Its salts crystallize, and are soluble in water. In the seeds there is also about thirty per cent. of a drying fixed oil.

The eclectic *lobelin* is not the alkaloid, but in the nature of a powdered extract.



FIGS. 359-362.—Lobelia Inflata, natural size ; flower, seed, and longitudinal section of seed, enlarged.

Properties.—It is sialagogue, expectorant, emetic, narcotic, purgative ; in large doses, powerfully depressant.

Its most valuable use is in *asthma.*

Dose.—As an emetic, 0.5 to 1.5 gram (8 to 20 grains) ; or, as an expectorant, in much smaller doses.

LOBELIÆ ACETUM; U. S.

VINEGAR OF LOBELIA.

Thirty grams (463 grains) lobelia herb, in No. 30 powder, is moistened with one hundred and fifty cubic centimeters (5 fluidounces) diluted acetic acid, packed in a conical glass percolator, macerated twenty-four hours, and then percolated with the same menstruum until three hundred cubic centimeters (10 fluidounces) of product has been received.

In the previous edition of the U. S. Pharmacopœia (1870) the vinegar of lobelia was made about one-fifth stronger = one troyounce to eight fluidounces of finished product. In the present Pharmacopœia (1880) the preparation represents ten per cent. by weight of the drug.

The preparation is little used. It contains the alkaloid lobeline in combination with the acetic acid.

Dose.—One to four cubic centimeters (15 to 60 minims).

LOBELIÆ EXTRACTUM.

EXTRACT OF LOBELIA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.05 to 0.30 gram (1 to 5 grains).

LOBELIÆ [HEBÆ] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF LOBELIA [HERB].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.2 to 2 cubic centimeters (3 to 30 minims).

LOBELIÆ INFUSUM.

INFUSION OF LOBELIA.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Eight to twenty cubic centimeters (2 to 5 fluidrachms), as an emetic. One to five cubic centimeters (15 to 75 minims), or about a teaspoonful, as an expectorant.

LOBELIÆ TINCTURA; U. S.

TINCTURE OF LOBELIA.

Moisten sixty grams (917 grains) lobelia, in No. 40 powder, with sixty cubic centimeters (2 fluidounces) diluted alcohol and macerate twenty-four hours ; then pack it tightly in a cylindrical percolator and percolate with diluted alcohol until three hundred grams (or about 10 fluidounces) of tincture has been obtained.

This tincture is thirty-three per cent. stronger than the tincture of lobelia of the old Pharmacopœia (1870).

Dose.—0.5 to 3 cubic centimeters (10 to 45 minims).

LOBELIÆ TINCTURA ÆTHEREA.

ETHEREAL TINCTURE OF LOBELIA.

Macerate thirty grams (463 grains) lobelia, in No. 40 powder, with one hundred and twenty cubic centimeters (4 fluidounces) alcohol and one hundred and twenty cubic centimeters (4 fluidounces) ether for seven days. Express and filter.

Dose.—One to two cubic centimeters (15 to 30 minims) as an antispasmodic. At one time this preparation enjoyed great reputation in the treatment of asthma.

Lobeliæ Semina.

LOBELIA SEED.

Origin, etc.—See Lobelia.

Description.—About 0.75 millimeter ($\frac{1}{33}$ inch) in length and 0.3 millimeter ($\frac{1}{85}$ inch) in breadth, dark brown, presenting under the microscope a net-like pitted surface, as seen in Figure 355. They always accompany the official drug and furnish a good sign by which to identify it.

Constituents and Uses.—The same as of lobelia.

Dose.—0.3 to 1 gram (5 to 15 grains).

LOBELIÆ SEMINIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF LOBELIA SEED.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.3 to 1.5 cubic centimeter (5 to 20 minims).

Lolium.

LOLIUM.

Darnel.

Origin.—*Lolium temulentum*, Linné (*Graminaceæ*).

Habitat.—Asia and Europe.

Part used.—The fruit or grain (caryopsis).

Description.—Oblong-ovoid, about five millimeters (⅕ inch) long, smooth, pale brownish, interiorly white, inodorous, having a farinaceous, afterward bitterish taste.

Constituents.—Fixed oil, starch, etc. It is not determined what constitutes the poisonous principle.

Medicinal Uses.—Darnel is a narcotic poison, but has been medicinally employed only as an ingredient of poultices to relieve *pain*, etc.

Lotiones.

LOTIONS.

These preparations are usually solutions in water, or in water with alcohol or glycerin, and are used for external application as washes, or by soaking lint in them and applying to the affected part. They are intended to influence deep-lying structures as well as the external surfaces.

Lupulinum ; U. S.

LUPULIN.

Lupuli Glandulæ—Lupulina, Phar. 1870, *Hopfenmehl, Lupulin*, G.; *Lupuline, Lupulite*, F.

Origin.—*Humulus Lupulus*, Linné (*Urticaceæ*).

Habitat.—Cultivated.

Part used.—The glandular powder separated from the hops.

Description.—A coarse, brownish-yellow, or orange-brown powder. Resinous, aromatic, bitter. Under the microscope the glands appear to have various forms, depending upon different positions on the slide. The general appearance is shown in Figure 363. Ether dissolves about seventy-five per cent.

Constituents.—From two to three per cent. of *volatile oil*, resin, *lupamaric acid*, wax, etc. The volatile oil contains valerianic acid after long exposure. Hence lupulin acquires a disagreeable valerianic acid odor when old.

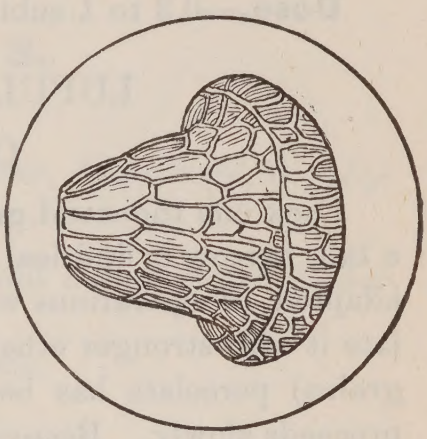


Fig. 363.—Lupulin Gland, enlarged.

Test.—Lupulin sometimes contains sand and other impurities to such an extent as to yield up to even forty per cent. ash. It should not leave more than eight per cent. of ash, and after shaking with water but little sediment should deposit when allowed to stand.

Medicinal Uses.—Similar to those of hops, as the action of the latter depends on this drug. It is tonic and somewhat anodyne. Especially useful to allay irritation of the genito-urinary organs, as in *priapism, painful erections* in *gonorrhœa, chordee*, etc. It is also used to allay *irritation of the bladder* and *seminal emissions*.

Dose.—0.3 to 1 gram (5 to 15 grains).

LUPULINI EXTRACTUM.

Extract of Lupulin.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brown.

Dose.—0.1 to 0.5 gram (2 to 8 grains) several times a day.

LUPULINI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Lupulin.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug.

As a *menstruum* use alcohol.

Moisten the drug with one hundred grams (about 4⅙ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.3 to 1 cubic centimeter (5 to 15 minims).

LUPULINI OLEORESINA; U. S.

OLEORESIN OF LUPULIN.

Pack one thousand grams (35 ounces 120 grains) lupulin firmly into a tall, narrow cylindrical percolator, provided with cover and receptacle adapted to operations with volatile liquids (see page 721), and percolate it with stronger ether until fifteen hundred grams (52 ounces 400 grains) percolate has been obtained, taking care that the percolation proceeds slowly. Recover about one thousand grams of the ether by distillation on a water-bath, and put the residue into a porcelain evaporating-dish and expose it until the remainder of the ether has evaporated away.

Keep the product in a well-corked, wide-mouthed bottle.

Dose.—0.1 to 0.25 gram (2 to 4 grains).

LUPULINI TINCTURA.

TINCTURE OF LUPULIN.

Tinctura Lupulinæ, Phar. 1870.

Moisten sixty grams (917 grains) lupulin with alcohol, pack it in a cylindrical percolator, and percolate with alcohol until four hundred and eighty cubic centimeters (16 fluidounces) tincture has been obtained.

This tincture is still used to some extent. It was dismissed from the new Pharmacopœia.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

Lycoperdon.

LYCOPERDON.

Tuckahoe, Indian Bread, Puff Ball.

Origin.—*Lycoperdon solidum*, Gronovius (*Fungi*).

Habitat.—The southern portions of the United States.

Description.—Large, irregularly shaped, but ordinarily more or less globular bodies of from a few ounces to several pounds in weight.

Externally grayish-black, rough, wrinkled ; interiorly whitish, mealy, spongy, tough, fissured. Odor faint ; taste insipid.

Constituents.—Pectose, cellulose, etc.

Medicinal Properties and Uses.—Said to be narcotic, but is, nevertheless, also stated to be, or to have been, used as food. The powdered fungus has been used as a hæmostatic.

Lycopodium ; U. S.

LYCOPODIUM.

Lycopodii Sporidia—Bärlappsamen, Streupulver, Hexenmehl, G.; *Lycopode*, F.; *Gul Nicht*, Sw.

Origin.—*Lycopodium clavatum*, Linné ; and other species of *Lycopodium* (*Lycopodiaceæ*).

Habitat.—Russia, Germany, Switzerland, etc.

Part used.—The sporules.

Description.—See the Pharmacopœia, page 212.

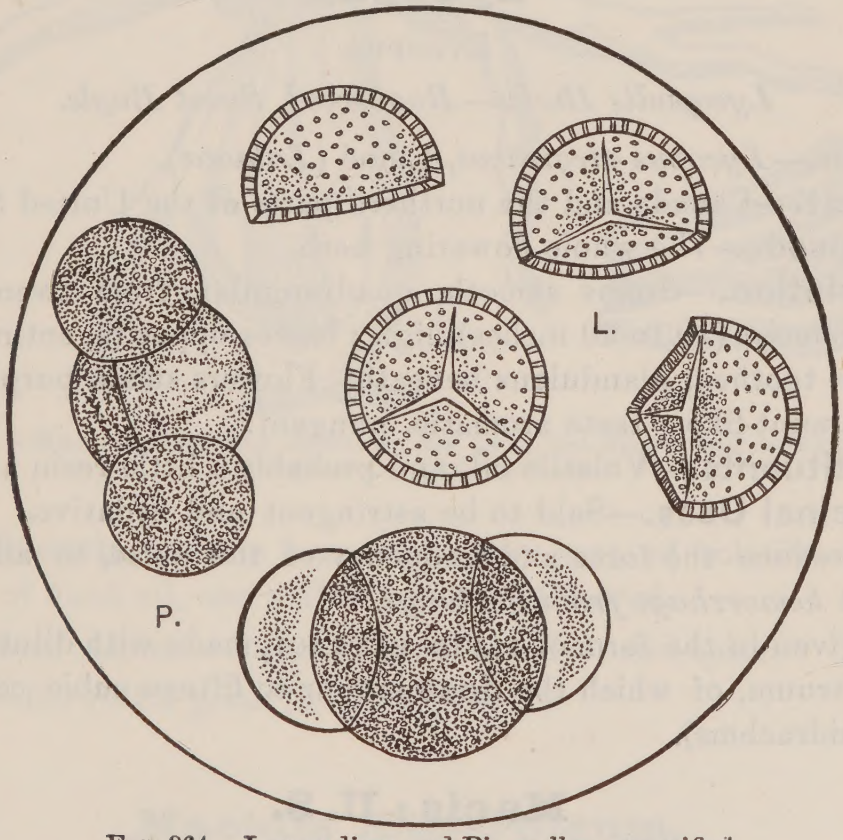


FIG. 364.—Lycopodium and Pinepollen, magnified.

A very fine, mobile, pale yellow powder, inodorous and tasteless. It floats on water and is not wetted unless first boiled with it, or treated with alcohol or ether, or subjected to long-continued trituration. After such treatment it sinks in water at once. It is readily moistened by

oils, alcohol, benzol, chloroform, and ether. Under strong trituration the granules cohere, assume a grayish tint, and afterward leave an oily stain on paper. It adheres to the fingers. Ignites and burns with a sizzling noise when thrown into a flame. Under the microscope the particles have the appearance shown in the illustration.

Must be free from pine pollen (the appearance of which is also shown in the illustrations), starch, sand, and other impurities. No strong odor should be developed when the lycopodium is burned. Sand is frequently found in lycopodium, and that impurity should condemn the article.

Constituents.—Contains forty-seven per cent. of a bland fixed oil, and should leave only about four per cent. ash. A larger percentage of ash indicates mineral impurities (sand).

Uses.—For dusting excoriated surfaces, to cover and protect them. Also as a conspergative for pills, troches, and plasters, to prevent adhesion, for which purpose lycopodium has no superior.

Lycopus.

LYCOPUS.

Lycopodis Herba—Bugleweed, Sweet Bugle.

Origin.—*Lycopus virginicus*, Linné (*Labiatæ*).

Habitat.—Canada and the northern parts of the United States.

Part used.—The whole flowering herb.

Description.—Stems smooth, quadrangular, from twenty-five to fifty centimeters (10 to 20 inches) high ; leaves opposite, entire, elliptic-lanceolate, toothed, glandulous beneath. Flowers small, purplish. Odor somewhat mint-like ; taste aromatic, pungent.

Constituents.—Volatile oil, and probably a little resin and tannin.

Medicinal Uses.—Said to be astringent and sedative. Has been given to reduce the force and frequency of the pulse, to allay *cough*, and arrest *hemorrhage from the lungs.*

Best given in the form of FLUID EXTRACT, made with diluted alcohol as a menstruum, of which the **dose** is four to fifteen cubic centimeters (1 to 4 fluidrachms).

Macis ; U. S.

MACE.

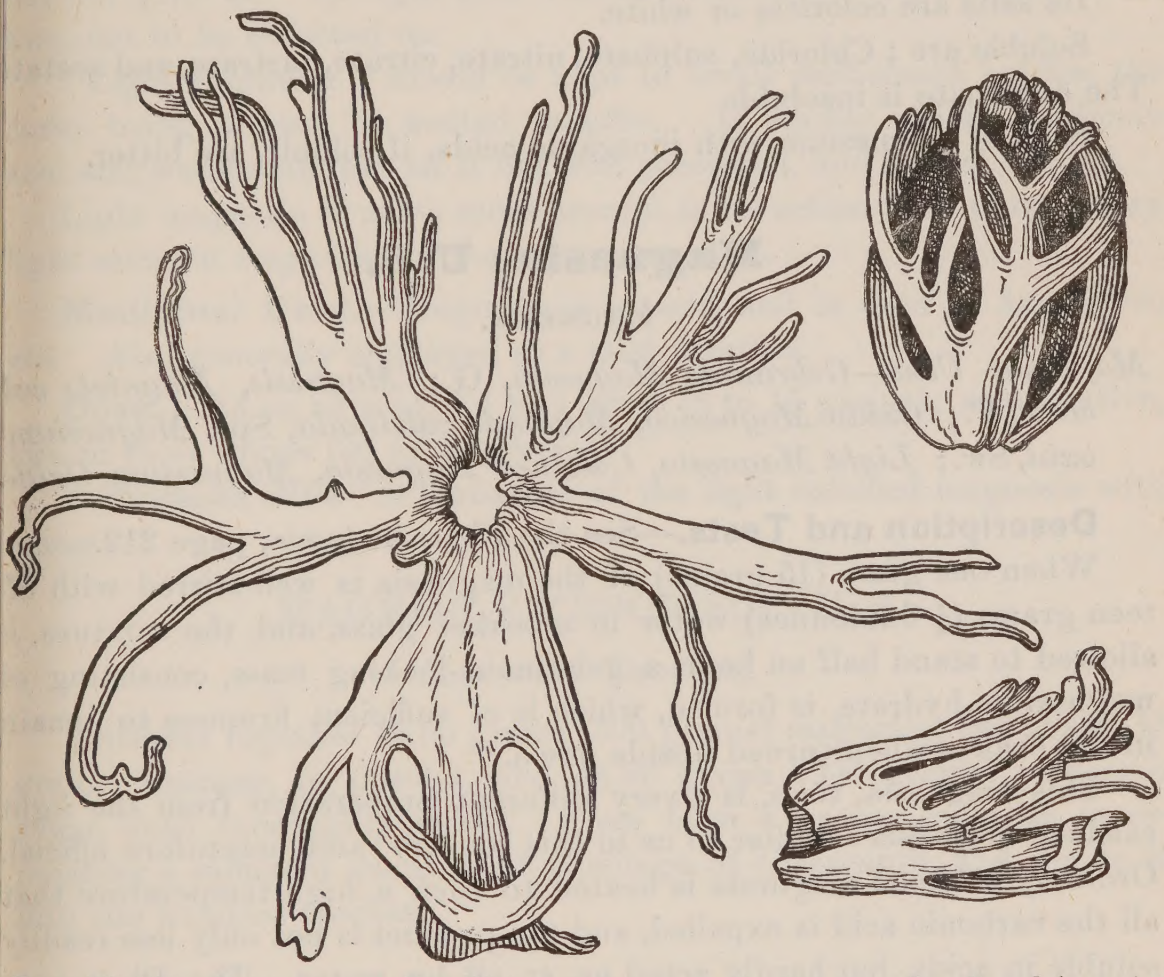
Muskatblüthe, G.; *Fleur de muscade*, F.; *Macias*, Sp.; *Muskotblomma*, Sw.

Origin.—*Myristica fragrans*, Houttuyn (*Myristicaceæ*).

Habitat.—Cultivated on several East India islands.

Part used.—The arillus of the fruit.

Description.—The fleshy covering of the nutmeg constitutes the mace. It is formed as seen in the illustrations, has an orange-red, oily appearance, is very fragrant, and has a spicy taste.



FIGS. 365-367.—Mace, surrounding Nutmeg; dry as in the drug; and softened in water and expanded; all natural size.

Constituents.—From four to nine per cent. of volatile oil. Also two kinds of fixed oil, one yellow and the other red.

Medicinal Uses.—Stimulant, carminative, and spice.

Dose.—0.5 to 1.5 gram (8 to 22 grains).

Macidis Ætheroleum.

VOLATILE OIL OF MACE.

Oil of Mace.

Colorless, or very pale yellowish, aromatic, soluble in alcohol, closely resembling the volatile oil of nutmeg, and probably identical with it.

Magnesium.

MAGNESIUM.

A silver-white malleable metal, which may be ignited, and burns in the air with a strong light. Its specific gravity is only 1.75.

Its salts are colorless or white.

Soluble are : Chloride, sulphate, nitrate, citrate, tartrate, and acetate. The carbonate is insoluble.

Salts of magnesium with inorganic acids, if soluble, are bitter.

Magnesia; U. S.

MAGNESIA.

Magnesia Usta—Gebrannte Magnesia, G.; *Magnésie, Magnésie calcinée*, F.; *Oxido Magnesico, Magnesia calcinada*, Sp.; *Magnesium-oxid*, Sw.; *Light Magnesia, Calcined Magnesia, Magnesium Oxide.*

Description and Tests.—See the Pharmacopœia, page 212.

When one gram (15 grains) of the magnesia is well stirred with fifteen grams (½ fluidounce) water in a beaker glass, and the mixture is allowed to stand half an hour, a gelatinous-looking mass, consisting of magnesium-hydrate, is formed, which is of sufficient firmness to remain in the beaker when turned upside down.

This magnesia, then, is a very different preparation from the light calcined magnesia familiar to us in this country, and heretofore official. Ordinary calcined magnesia is heated to such a high temperature that all the carbonic acid is expelled, and the product is not only less readily soluble in acids, but hardly acted on at all by water. The Pharmacopœia prescribes a test which requires the absence of carbonate. This is inconsistent with the official description of the properties of the preparation, for it cannot be made perfectly free from carbonate without the use of very high heat, which almost invariably destroys its ability to combine with water (become hydrated) and form a gelatinous mass as described. At the same time no considerable effervescence with diluted acids should be allowed.

An anhydrous magnesium carbonate, with some magnesium oxide, may be readily obtained by calcination for a short time, which forms a gelatinous mass with water ; but it is largely carbonate and does not retain its property of gelatinizing. What the Pharmacopœia intends to be used is a magnesium oxide which readily combines with water (hydrates), is easily soluble in very dilute acids and in the acid liquids of the stomach, and thus medicinally more effective than a " dead-burnt "

magnesium oxide, which is scarcely at all acted on by any of these liquids, and hence is not as desirable an antacid as even the magnesium carbonate.

To attain the object nearly all the carbonic acid may be driven off, but not quite all. A slight effervescence with diluted acid ought, therefore, not to be objected to.

"Light Magnesia" should be kept in small well-closed bottles, the corks being dipped in melted paraffin. It readily absorbs carbonic acid and water from the air if not well protected, and is then spoiled.

Light magnesia is much more prompt in its action than the ordinary light calcined magnesia, or the heavy magnesia.

Medicinal Uses.—Magnesia is antacid, and is used in *heartburn*, etc. Also generally employed as a mild laxative.

Dose.—As an antacid, 0.5 to 1 gram (8 to 15 grains); as a laxative, two to three grams (30 to 45 grains).

"*Magnesia Milk*" is a mixture of the light calcined magnesia with water.

MAGNESIÆ TROCHISCI; U. S.

MAGNESIA TROCHES.

Triturate together 19.50 grams (300 grains) magnesia, one gram (15 grains) nutmeg, in powder, and 58.50 grams (900 grains) powdered sugar, until thoroughly mixed. Then form a proper mass by incorporating a sufficient quantity of mucilage of tragacanth, and divide it into one hundred troches.

Magnesia Ponderosa; U. S.

HEAVY MAGNESIA.

Heavy Calcined Magnesia.

Prepared by calcining the heavy variety of magnesium carbonate. It is smoother and considerably heavier than the "Light Magnesia," but is not a heavy powder. When mixed with water it does not absorb or combine with it, and turn into a gelatinous mass, as the light magnesia does. The statement of the Pharmacopœia that magnesia ponderosa is a dense powder, "corresponding in all other properties with magnesia," is, therefore, erroneous in that particular.

Heavy magnesia is much slower in its action than even the ordinary light calcined magnesia, which in turn acts far less promptly than the new official light magnesia.

Uses.—Like those of magnesia.

Magnesii Acetas.

MAGNESIUM ACETATE.

Magnesicus Acetas.

Prepared by dissolving the desired quantity of magnesium carbonate in a sufficient quantity of acetic acid, filtering the solution, and evaporating it to dryness.

Description.—Amorphous, white, sticky, soluble in water and in alcohol, bitterish. If the solution prepared as described above be evaporated until only one hundred and fifty grams (5 ounces) remains, a colorless syrupy liquid will be obtained.

Uses.—Laxative. Seldom employed.

Dose.—Eight to thirty grams (¼ to 1 ounce).

Magnesii Carbonas; U. S.

CARBONATE OF MAGNESIUM.

Magnesicus Carbonas—Magnesium Carbonate; Magnesia Carbonica, Magnesia Alba—Weisse Magnesia, Kohlensaure Magnesia, G.; *Carbonate de magnésie, Magnésie blanche*, F.; *Subcarbonato de magnesia*, Sp.; *Magnesia*, Sw.; *Carbonate of Magnesia, Light Magnesium Carbonate.*

Description and Tests.—See the Pharmacopœia, page 213.

It yields about 28.9 per cent. magnesium oxide when calcined until all traces of carbonic acid have been driven off. It contains about thirteen per cent. of water.

Uses.—Like those of calcined magnesia.

Dose.—As an antacid, one to two grams (15 to 30 grains); as a laxative, two to eight grams (30 to 120 grains).

MAGNESIÆ ET ASAFŒTIDÆ MISTURA; U. S.

MIXTURE OF MAGNESIA AND ASAFŒTIDA.

Dewee's Carminative.

Triturate twenty-five grams (386 grains) magnesium carbonate and fifty grams (1 ounce 334 grains) sugar with thirty-five grams (1 ounce 100 grains, or 11½ fluidrachms) tincture of asafœtida and five grams (77 grains) tincture of opium; then add gradually enough distilled water to make the whole product weigh five hundred grams (or measure 17 fluidounces).

Carminative and antacid. Useful in *flatulent colic*, etc.

Dose.—Teaspoonful to tablespoonful, repeated if necessary.

MAGNESIÆ MISTURA CARMINATIVA; DALBY.

DALBY'S CARMINATIVE.

Triturate together, until mixed, 0.25 cubic centimeter (4 minims) volatile oil of caraway, and the same quantity each of volatile oil of fennel and volatile oil of peppermint, seventy grams (2 ounces 200 grains) magnesium carbonate, and one hundred and eighty grams (6 ounces 150 grains) sugar. Add gradually and during constant trituration five hundred cubic centimeters (17 fluidounces) water. Finally add thirty-four cubic centimeters ($1\frac{1}{8}$ fluidounce) tincture of opium, three grams (46 grains) carbonate of potassium, and enough water to make the whole measure one thousand cubic centimeters (34 fluidounces).

Must be thoroughly shaken when to be dispensed or used. Each fluidounce contains one and one-half grain of opium.

Dose.—Dessertspoonful to tablespoonful.

Magnesii Citras Granulatus; U. S.

GRANULATED CITRATE OF MAGNESIUM.

Crush three hundred and thirty grams (11 ounces 280 grains) citric acid to coarse powder in a Wedgewood mortar; add one hundred and ten grams (4 ounces 256 grains) magnesium carbonate, and a sufficient quantity of distilled water, and mix the whole intimately, reducing it to a thick paste. Dry this paste at not over 30° C. (86° F.), and then reduce it to a fine powder. Mix the powder thoroughly with eighty grams (2 ounces 360 grains) powdered sugar, three hundred and seventy grams (13 ounces 22 grains) sodium bicarbonate, and one hundred and fifty grams (5 ounces 130 grains) of previously finely powdered citric acid. Dampen the whole with (a sufficient quantity of) alcohol, and rub the damp mixture through a No. 20 sieve, made of tinned iron, so that a coarse granular powder is obtained. Then "dry it in a moderately warm place."

Description.—See the Pharmacopœia, page 214.

Preservation.—Must be kept in well-corked bottles, the corks being first dipped in melted paraffin.

Medicinal Uses.—Laxative and refrigerant. Useful in febrile conditions.

Dose.—Eight to thirty grams ($\frac{1}{4}$ to 1 ounce).

MAGNESII CITRATIS LIQUOR; U. S.

SOLUTION OF CITRATE OF MAGNESIUM.

Dissolve three hundred and twelve grams (4,800 grains) citric acid in one thousand four hundred and forty grams (about 3 pints) water, add one hundred and fifty-six grams (2,400 grains) carbonate of magnesium, and stir until all is dissolved. Filter. Divide the filtered solution equally between twelve "citrate of magnesia bottles."[1] Add to each bottle eighty grams (about 2 fluidounces) syrup of citric acid. Then add enough boiled and filtered water to nearly fill the bottles. Finally put into each bottle two grams (30 grains) bicarbonate of potassium, in crystals, cork immediately, and tie over with twine.

The quantity of bicarbonate of potassium is hardly sufficient; 2.65 grams (or 40 grains) would be better. "Citrate of magnesia" should be kept in a cool place, the bottles lying on their sides.

Medicinal Uses.—This is one of the most useful and pleasant of saline purgatives, and a deservedly popular remedy.

As a full purgative the contents of a bottle may be taken at once; as a laxative, in three or four equal potions at intervals of an hour or two until the desired effect is produced.

Magnesii Sulphas; U. S.

SULPHATE OF MAGNESIUM.

Magnesicus Sulphas; Magnesium Sulphate.—Magnesia Sulphurica, Sal Amarum, Sal Anglicum—Bittersalz, Schwefelsaure Magnesia, G.; *Sulfate de Magnésie, Sel d'Epsom, Sel de Sedlitz, Sel Amer,* F.; *Sulfato Magnesico,* Sp.; *Svafvelsyrad Talk, Engelskt Salt,* Sw.; *Epsom Salt.*

Description and Tests.—See the Pharmacopœia, page 214.

If it contains magnesium chloride it is moist; but pure magnesium sulphate effloresces. A considerable quantity of the salt can be dissolved in a much diluted alcohol.

A solution of magnesium sulphate is capable of dissolving recently precipitated magnesium carbonate.

Medicinal Uses.—Sulphate of magnesia is a popular saline purgative, much used in *constipation, febrile affections,* etc.

It is useful in the constipation and griping of *lead-poisoning,* and may also be given to relieve the straining at stool in *dysentery.*

[1] "Citrate of magnesia bottles" are usually of the capacity of three hundred and fifty cubic centimeters (12 fluidounces).

Often combined with senna.

Dose.—Ten to thirty grams ($\frac{1}{3}$ to 1 ounce) in solution.

Solution for Dispensing Purposes.—Dissolve two hundred grams (7 ounces 24 grains avoirdupois) of the magnesium sulphate in enough distilled water to make the finished solution measure four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces). Filter.

Each cubic centimeter of the solution contains one-half gram of the salt; one hundred and five minims contains fifty grains.

MAGNESIÆ SULPHATIS ENEMA; B.

ENEMA OF MAGNESIUM SULPHATE.

Dissolve thirty grams (1 ounce) magnesium sulphate in four hundred and fifty cubic centimeters (15 fluidounces) mucilage of starch, add thirty cubic centimeters (1 fluidounce) olive oil, and shake well.

For one injection. Purgative.

Magnesii Sulphis; U. S.

SULPHITE OF MAGNESIUM.

Magnesicus Sulphis; Magnesium Sulphite.

Description and Tests.—See the Pharmacopœia, page 215.

Changes into sulphate of magnesium on exposure, and must, therefore, be kept in well-closed bottles—best in bottles holding only about two hundred and fifty grams (8 ounces 358 grains) each. The corks should be dipped in melted paraffin before being inserted.

The salt is used for the same purposes as other sulphites and on account of the sulphurous acid it contains.

The **dose** is one to two grams (15 to 30 grains).

Magnolia; U. S.

MAGNOLIA.

Origin.—*Magnolia glauca*, *Magnolia acuminata*, and *Magnolia tripetala*, Linné (*Magnoliaceæ*).

Habitat.—The United States.

Part used.—The bark.

Description.—See the Pharmacopœia, page 215.

Young bark is better than the old.

Constituents.—A neutral principle, called *magnolin*, which is crystalline, has an acrid irritant taste, is insoluble in water, but soluble in

alcohol. It also contains a soft, pungent resin, some volatile oil, and tannin.

Medicinal Uses.—Bitter aromatic tonic.

Best given in the form of FLUID EXTRACT, made with alcohol as a menstruum, of which the **dose** is two to five cubic centimeters (30 to 75 minims).

Majorana.

SWEET MARJORAM.

Meiran, G.; *Marjolaine*, F.; *Mejram*, Sw.

Origin.—*Origanum Majorana*, Linné (*Labiatæ*).

Habitat.—Cultivated.

Part used.—The herb.

Description.—The leaves are glandulous, grayish-green, soft, hairy. Flowers whitish or pale pink. Fragrant, aromatic, pungent.

Constituents.—A yellowish-green volatile oil, and some tannin.

Properties.—Stimulant, carminative, emmenagogue.

Dose.—Five to ten grams (60 to 150 grains) in infusion.

MAJORANÆ UNGUENTUM.

OINTMENT OF SWEET MARJORAM.

Moisten sixty grams (2 ounces) sweet marjoram with about sixty cubic centimeters (2 fluidounces) alcohol, and set it aside in a covered vessel for a few hours. Then put it in a porcelain evaporating dish, add three hundred grams (10 ounces) lard, and digest on water-bath until the alcohol is dissipated. Express and strain.

Fresh sweet marjoram makes a much nicer ointment than the dried, and when the fresh herb is used the use of alcohol should be omitted.

Maltum; U. S.

MALT.

The malted seed of *Hordeum distichon*, Linné.

Must be fresh, of a pale amber color (not darker); has an agreeable odor, and sweet taste.

Constituents.—The process of malting—simultaneous exposure to moisture and heat—produces in the grain a ferment which has received the name of *diastase*, and which at an elevated temperature possesses the power of causing the rapid conversion of starch into *dextrin*, and finally

into *glucose*. Malt of good quality contains about sixty-five per cent. of soluble matters, which it yields to boiling water, forming a dark-brown infusion.

Proust found in malt fifty-six per cent. starch, fifteen per cent. sugar, and fifteen per cent. gum (dextrin ?).

MALTI EXTRACTUM; U. S.

EXTRACT OF MALT.

Pour five liters (about 11 pints) of water upon five thousand grams (about 11 pounds) of malt, ground not finer than No. 12, and macerate six hours. Then add twenty liters (about 44 pints) water 30° C. (86° F.) warm, and digest in water-bath at not above 55° C. (131° F.) for an hour. Strain and press out all the liquid from the residue. Evaporate the strained liquid on a water-bath, or by means of a vacuum apparatus, at a temperature not above 55° C. (131° F.) as rapidly as practicable to the consistence of thick honey.

Must be kept in tightly closed vessels in a cool place.

Medicinal Uses.—Extract of malt contains all the nutritive substances of malted barley. It also contains a peculiar ferment, *diastase*, which resembles the ptyalin of the saliva, and possesses the property of rendering starch soluble and easily assimilated. Owing to the diastase (*maltin*), this preparation is of great value in aiding and promoting the digestion of amylaceous food. Its use is indicated in *chronic wasting diseases*, *general debility*, and *nervous exhaustion*, whether of a temporary character or depending on organic diseases such as *consumption*.

Malt extract is often combined with other remedies, as with cod-liver oil, phosphate of iron, hops, hypophosphite of calcium, pepsin, pepsin and lactic acid, etc.

The use of some of these combinations is indicated in *anæmia*, *general apepsia*, *rickets*, or for the nourishment of nursing women, etc.

Dose.—A teaspoonful to a tablespoonful for adults. Best taken at meal-time, in soup, milk, wine, or beer. It may also be taken pure.

Manganum.

MANGANESE.

Manganesium.

A metal resembling iron in its chemical combinations. It occurs chiefly in native black oxide of manganese.

Manganous salts are either white or pale pink. The sulphate, chloride, and iodide, are soluble in water.

Medicinal Uses.—The salts of manganese are occasionally used in the same kinds of cases in which salts of iron have been found of benefit.

Mangani Carbonas.

CARBONATE OF MANGANESE.

Manganosus Carbonas; Manganous Carbonate.

May be prepared by precipitation from a sweetened solution of sulphate of manganese with a solution of sodium carbonate in a manner similar to the precipitating of ferrous carbonate for making the saccharated carbonate of iron. The precipitate, after having been well washed, is to be dried between blotting-paper, at a moderate heat, as rapidly as possible, and kept in bottles tightly closed with corks dipped in melted paraffin.

It is a pale pinkish brown, or nearly white powder, odorless, tasteless, insoluble in water, but soluble in carbonic-acid water.

Dose.—0.1 to 0.5 gram (2 to 8 grains).

Mangani Chloridum.

CHLORIDE OF MANGANESE.

Manganosum Chloridum; Manganous Chloride.

This salt may be obtained from the liquid residue left in the generator after making chlorine water. It is purified by recrystallization.

Pale rose-colored crystals, soluble in water and in alcohol.

Has been used externally to stimulate *ulcers*, etc.

Mangani Hypophosphis.

HYPOPHOSPHITE OF MANGANESE.

Manganosus Hypophosphis; Manganous Hypophosphite.

A pale rose-tinted, nearly white, powder, insoluble in water.

Dose.—0.1 to 1 gram (2 to 15 grains).

Mangani Iodidum.

IODIDE OF MANGANESE.

Manganosum Iodidum; Manganous Iodide.

A pale rose-colored deliquescent salt. Rapidly oxidizes in contact with the air.

Dose.—0.1 to 0.3 gram (2 to 5 grains).

MANGANI IODIDI SYRUPUS.

SYRUP OF IODIDE OF MANGANESE.

Manganosi Iodidi Syrupus; Syrup of Manganous Iodide.

Dissolve one hundred grams (3 ounces 230 grains) sulphate of manganese in one hundred and five cubic centimeters (3½ fluidounces) water mixed with fifteen cubic centimeters (½ fluidounce) simple syrup. Dissolve one hundred and twenty grams (4 ounces) iodide of potassium in one hundred and five cubic centimeters (3½ fluidounces) water, also mixed with fifteen cubic centimeters (½ fluidounce) simple syrup. Mix the solutions, and shake well. Cool the mixture to about 50° F. Filter, rinsing the precipitate with a little sweetened water, and let the washings be mixed with the previous filtrate, arranging the filtration so that the liquid runs into a bottle containing seven hundred grams (24 ounces 300 grains) sugar. Shake the whole together until dissolved, adding enough water to make the finished product measure one thousand cubic centimeters (34 fluidounces).

Each cubic centimeter (16 minims) of this syrup contains 0.10 gram (1½ grain) manganous iodide. It also contains a trifling amount of sulphate of potassium.

Dose.—A teaspoonful.

Mangani Lactas.

LACTATE OF MANGANESE.

Manganosus Lactas; Manganous Lactate.

May be obtained by dissolving carbonate of manganese in lactic acid with the aid of heat.

Pale rose-colored crystals, soluble in twelve times their weight of water.

Dose.—0.1 to 0.5 gram (2 to 8 grains).

Mangani Oxidum Nigrum; U. S.

BLACK OXIDE OF MANGANESE.

Manganicum Dioxidum; Dioxide of Manganese.—Superoxide of Manganese, Pyrolusite; Braunstein, G.

Native crude pyrolusite containing not less than sixty-six per cent. pure binoxide of manganese (MnO_2).

Description and Tests.—See the Pharmacopœia, page 216.

This substance, as sold in powder, is very frequently adulterated

with powdered coal, etc., and should always be tested, as its value is to be measured by its contents of pure oxide of manganese, and because the presence of coal-dust may give rise to dangerous explosions when this substance is used with chlorate of potassium in making oxygen gas.

It is used for generating oxygen or chlorine, and for making chlorine water. (See "Chlorum.")

Medicinal Uses.—Has been employed like subnitrate of bismuth in *gastralgia*, etc.

Dose.—0.1 to 1 gram (2 to 15 grains).

Mangani Phosphas.

PHOSPHATE OF MANGANESE.

Manganosus Phosphas; Manganous Phosphate.

Dissolve one hundred grams (3 ounces 230 grains) manganese sulphate in eight hundred cubic centimeters (27 fluidounces) water, and one hundred and ten grams (3 ounces 385 grains) sodium phosphate in another eight hundred cubic centimeters of water. Mix the solutions. Wash the precipitate well and dry it.

The preparation is a white powder, having sometimes a pinkish hue. It dissolves readily in dilute phosphoric or hydrochloric acid.

Dose.—0.5 to 1 gram (8 to 15 grains).

Mangani Sulphas; U. S.

SULPHATE OF MANGANESE.

Manganosus Sulphas; Manganous Sulphate.

A pale rose-colored crystallized salt.

Description and Tests.—See the Pharmacopœia, page 216.

Medicinal Uses.—This substance has been used as a cholagogue purgative. It is said to be very irritant in its action.

Dose.—0.1 to 0.5 gram (2 to 8 grains).

Mangostana.

MANGOSTEEN.

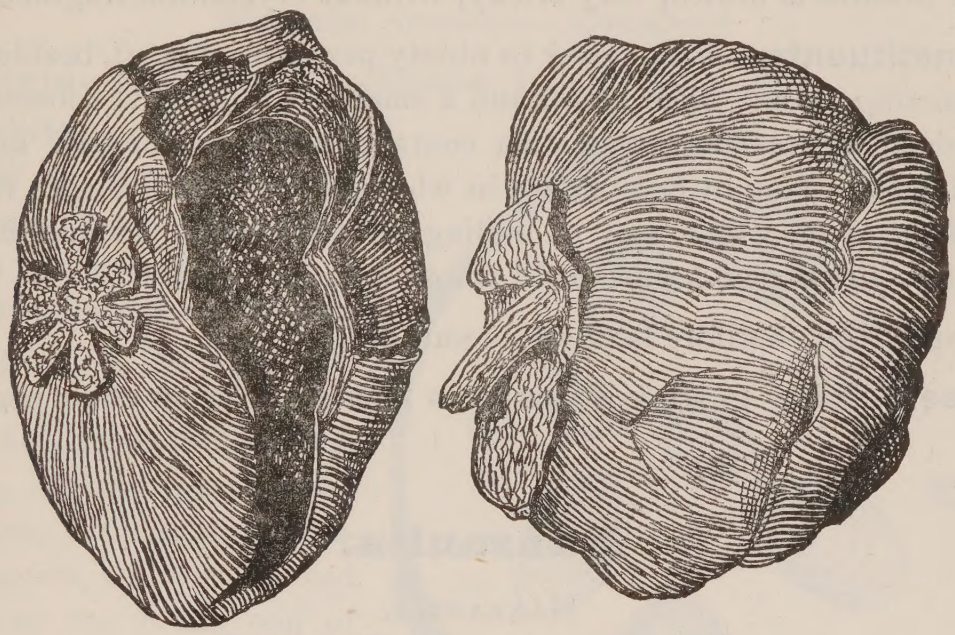
Mangostanæ Cortex; Mangosteen Rind.

Origin.—*Garcinia Mangostana*, Linné (*Guttiferæ*).

Habitat.—India.

Part used.—The rind of the fruit.

Description.—The fruit is about the size and form of small oranges, dark brown, mottled ; when dried the rind is hard, dark brown, smooth, thick, with prominent remains of the stigmas on one side, and hardened



FIGS. 368, 369.—Mangosteen, natural size.

remains of the calyx on the opposite side. Inodorous ; taste astringent, bitter.

Constituents.—Tannin and a bitter crystallizable principle, *mangostin.*

Medicinal Uses.—Mangosteen is a powerful astringent, useful in *diarrhœas*, *dysentery*, etc.

Manna ; U. S.

MANNA.

Origin.—*Fraxinus Ornus*, Linné (*Oleaceæ*).

Habitat.—Southern Europe, along the Mediterranean.

Drug.—The concreted saccharine exudation from incisions made in the bark of the tree (the "manna ash").

Description.—See the Pharmacopœia, page 216. Flattish trough-shaped, or triangular pieces of various lengths, dry, friable, yellowish-white, easily broken, porous, crystalline. This description applies to the *Large Flake Manna*, which is the best kind (manna canellata).

The *Small Flake Manna* consists of smaller, less clean, agglutinated, brownish-white pieces.

Both these kinds are good manna. The odor is honey-like but peculiar ; the taste sweet, slightly bitter, faintly acrid.

Manna in Sorts consists of small tears, or small fragments, forming a more or less sticky mass, a good deal contaminated by dirt, pieces of bark, etc.

Fat Manna is brown, very sticky, without crystalline fragments.

Constituents.—From forty to ninety per cent. *mannit*, besides *glucose*, *mucilage*, some *acrid resin*, and a small quantity of the fluorescent glucoside *fraxin*. The best manna contains the most mannit and the least glucose. Mannit crystallizes in white prisms or needles, is readily soluble in boiling water, and in boiling dilute alcohol. It may be dissolved also in about 6.5 parts cold water, but not readily.

Properties.—Mildly laxative, demulcent.

Dose.—Thirty to sixty grams (1 to 2 ounces) for an adult person.

Manzanita.

MANZANITA.

Manzanitæ Folia.

Origin.—*Arctostaphylos glauca*, Lindley (*Ericaceæ*).

Habitat.—California.

Part used.—Leaves.

FIG. 370.—Manzanita Leaf, natural size.

Description.—See the illustration. Pale green, thick, glandulous. Inodorous, astringent.

Constituents.—Tannin, arbutin, and probably also ericolin and ursone.

Medicinal Action.—This drug resembles uva ursi in its action. It is astringent, and in small doses stomachic and tonic ; but its most valuable property is its action on the kidneys. It is diuretic, and has been successfully used in various diseases of the urinary apparatus, especially in *calculous affections ;* also in *chronic pyelitis*, *cystitis*, *dysuria*, *strangury*, and *incontinence of urine* depending on an irritated condition of the bladder.

Best given in the form of FLUID EXTRACT (made with a menstruum consisting of alcohol and water mixed in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water), of which the **dose** is two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

Maranta.

MARANTA.

Marantæ Amylum—Arrowroot.

Origin.—*Maranta arundinacea*, Linné (*Cannaceæ*).

Habitat.—The Bermudas, West Indies, Central America, Brazil. Cultivated also in Georgia.

Description.—The fecula separated from the rhizome.

A fine, beautifully white starch, consisting of ovate granules, with delicate, distinct layers, and well-marked hilum at the broad end of each granule. (See the illustration.)

St. Vincent arrowroot is fully equal to *Bermuda arrowroot.*

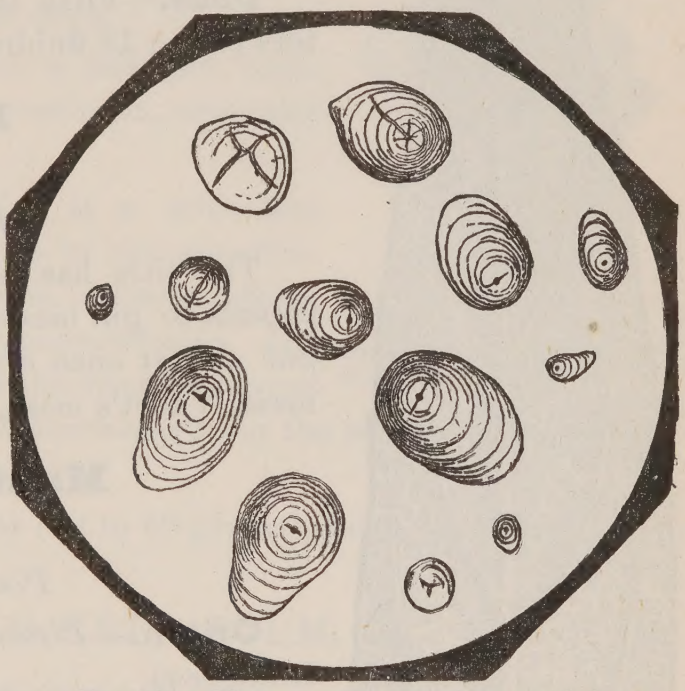


FIG. 371.—Maranta Arrowroot, magnified.

Constituent.—Wholly composed of starch.

Uses.—Same as those of starch.

Marrubium ; U. S.

MARRUBIUM.

Marrubii Herba—Hoarhound.

Origin.—*Marrubium vulgare*, Linné (*Labiatæ*).

Habitat.—Europe and America.

Parts used.—The leaves and tops.

Description.—See the Pharmacopœia, page 217.

Must be free from coarse stems, and have its proper color and a good odor.

Medicinal Uses.—Employed as a bitter tonic and stomachic in *dyspepsia* and in atonic conditions of the alimentary tract.

Best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum, of which the **dose** is four to eight cubic centimeters (1 to 2 fluidrachms).

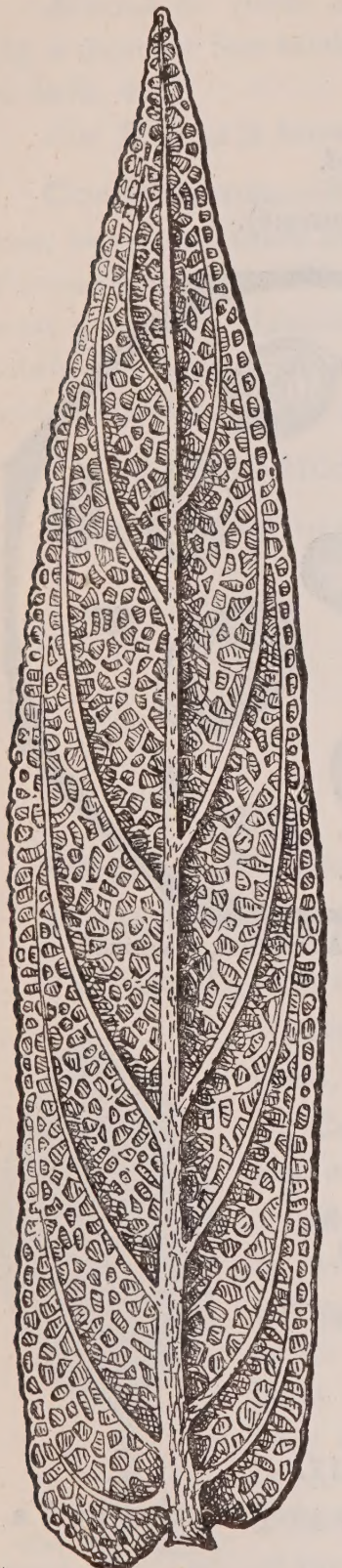


FIG. 372.—Matico Leaf, under side, natural size.

MARRUBII INFUSUM.

INFUSION OF MARRUBIUM.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

Massæ.

MASSES.

Pill Masses.

This title has been given in the new Pharmacopœia to pill masses prepared for making pills, but not at once divided into pills, such as blue mass, Vallet's mass, and solidified copaiba.

Mastiche; U. S.

MASTIC.

Pistaciæ Resina.

Origin.—*Pistacia Lentiscus*, Linné (*Terebinthaceæ*).

Habitat.—

Description.—See the Pharmacopœia, page 218.

Must be transparent, clear, and of pale color.

Uses.—Employed to fill *carious teeth* by soaking pledgets of cotton in an ethereal solution of mastic and pressing into the cavity of the affected tooth, and in making cements and varnishes. It is also an ingredient of the pills of aloes and mastic.

Matico; U. S.

MATICO.

Matico Folia.

Origin.—*Arthante elongata*, Miquel (*Piperaceæ*).

Habitat.—South America.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 219. Easily recog-

nized by the prominent venation on the under surface, which forms deep angular meshes. On the upper side the leaves are darker green and less hairy than beneath. The upper surface also presents a wrinkled appearance, from the fact that the network of veins is there depressed. The leaves are very brittle, and it is scarcely possible to find a whole leaf among the drug.

FIG. 373.—Fragment of Matico Leaf, upper surface, enlarged 5 diameters.

Constituents.—One and a half per cent. volatile oil, a soft green pungent resin, arthantic acid, and tannin.

Medicinal Uses.—Matico is a stimulant blennorrhetic, used in subacute or chronic affections of the urinary organs, as in *chronic cystitis*, *vesical catarrh*, *leucorrhœa*, *menorrhagia*, and *incontinence of urine*. It has also been employed in *diarrhœa*, *dysentery*, and *hemorrhages* from the stomach, bowels, kidneys, and lungs.

Dose.—Two to four grams (30 to 60 grains), best given as fluid extract.

MATICO EXTRACTUM.

Extract of Matico.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

Brown.

MATICO EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Matico.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of three hundred and seventy-five grams (about 15⅔ fluidounces) alcohol, one hundred and twenty-five grams (about 4⅙ fluidounces) water, and fifty grams (about 1⅘ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 5¾ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical perco-

lator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to four cubic centimeters (30 to 60 minims).

MATICO INFUSUM.

INFUSION OF MATICO.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of the British Pharmacopœia.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

MATICO TINCTURA ; U. S.

TINCTURE OF MATICO.

Moisten thirty grams (463 grains) matico, in No. 40 powder, with thirty cubic centimeters (1 fluidounce) diluted alcohol, pack it tightly in a cylindrical percolator, and percolate with diluted alcohol until six hundred cubic centimeters (10 fluidounces) tincture has been obtained.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Matricaria ; U. S.

MATRICARIA.

Matricariæ Flores—Kamille, Kamillenblumen, G.; *Fleurs de Camomille Commune*, F.; *Kamomillblommor*, Sw.; *German Chamomile.*

Origin.—*Matricaria Chamomilla*, Linné (*Compositæ*).

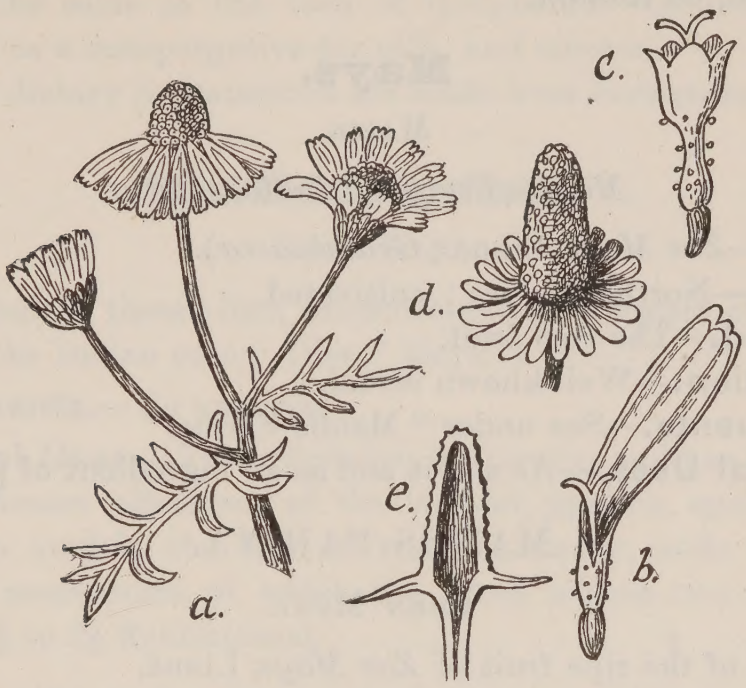
Habitat.—Europe.

Part used.—The flowers.

Description.—Yellow, with white ray-florets ; receptacle conical, naked, and hollow. (See the illustrations.)

Constituents.—About one-fourth per cent. of a blue *volatile oil* (the blue color being due to *azulen*) ; also bitter extractive, tannin, etc.

Tests.—The flowers should be whole, have their natural colors well preserved, and retain their strong, peculiar, rather agreeable odor.



FIGS. 374–378.—Matricaria. *a*, flowering branch, natural size; *b*, ray floret; *c*, disk floret; *d*, receptacle and involucre; *e*, longitudinal section of receptacle; *b*, *c*, *d*, and *e*, enlarged.

Medicinal Uses.—It is much used by the public in the form of tea as a diaphoretic, stomachic, and in large doses as an emetic.

Dose.—One to two grams (15 to 30 grains), best given in infusion or fluid extract.

MATRICARIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF MATRICARIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every two hundred grams (about 6⅔ fluidounces) of water.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

MATRICARIÆ INFUSUM.

INFUSION OF MATRICARIA.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms) of a cold infusion, several times daily, as a tonic ; as an emetic, the warm infusion, *ad libitum.*

Mays.

MAIZE.

Maidis Fructus; Indian Corn.

Origin.—*Zea Mays*, Linné (*Graminaceæ*).
Habitat.—North America ; cultivated.
Part used.—The ripe fruit.
Description.—Well-known cereal.
Constituents.—See under "Maidis Farina."
Medicinal Uses.—As a diet and as an ingredient of poultices.

MAIDIS FARINA.

CORN MEAL.

The meal of the ripe fruit of *Zea Mays*, Linné.

There are two principal varieties, yellow and white corn meal, either of which may be used.

It contains sixty-five per cent. starch, nine to ten per cent. nitrogenous substances, and six to seven per cent. fixed oil, besides sugar, cellulose, salts, and water. Thus it contains more fat than either oats, wheat, barley, or rye.

Corn meal is used for making poultices and for diluting mustard poultices.

FIG. 379.—Corn Starch, magnified.

Maidis Amylum.

CORN-STARCH.

The starch prepared from the ripe fruit of *Zea Mays*, Linné.

The process for its preparation is analogous to that by which wheat-starch is manufactured. The granules are of comparatively uniform size, and about one-third smaller than wheat-starch granules. They are of rather irregular form, with indistinct layers, and generally a slit hilum.

Corn-starch forms a beautifully white impalpable powder, which is inodorous and tasteless.

Uses.—The same as the uses of lycopodium—to dust *excoriated surfaces*, and as a conspergative for pills, and troches.

Excellent dietary preparations are made from corn-starch.

Maidis Stigmata.

CORN SILK.

The glistening, thread-like, brownish-yellow stigmata of the nearly ripe fruit of the Indian corn. (See "Mays.")

Constituents.—No analysis.

Medicinal Uses.—This substance is diuretic, and has been used in acute and chronic affections of the bladder, *pyelitis*, *cystitis*, etc. It has only been used in the form of FLUID EXTRACT, made with a dilute alcohol as a menstruum, of which the **dose** is from two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

Mel; U. S.

HONEY.

Honig, G.; *Miel*, F.; *Miel*, Sp.; *Honing*, Sw.

Origin.—A saccharine matter secreted by the honey-bee—*Apis mellifica*, Linné (*Hymenoptera*).

Description and Tests.—See the Pharmacopœia, page 219.

"Virgin Honey" is freshly prepared, light-colored, semi-liquid honey obtained by draining the honey-comb without using heat or pressure. It is the best kind.

"Clarified Honey" is darker, and obtained by melting the honey-comb and straining. The surest way to get good pure honey is to obtain fresh honey-comb and drain it.

The flavor of the honey depends greatly upon the food of the bees, and also upon the season at which it is deposited by them. A mild pure taste is indicative of good quality. Acridity is not one of the properties of good fresh honey. It is said that when the bees have access to narcotic plants their honey is apt to be poisonous. Honey collected in the mountain regions of Germany is regarded with suspicion, and American honey is expressly prohibited in one pharmacopœia (the Swedish)!

Constituents.—Fruit-sugar, which always remains liquid; and grape-sugar, which in time renders the honey granular and thick.

Medicinal Uses.—Honey is demulcent and slightly laxative. Used mainly as a sweetening agent in combination with other substances.

Its use as an ingredient of mouth-washes in *thrush*, etc., should be discouraged, as it often adds to the fermentation which causes the disease.

MEL DESPUMATUM; U. S.

CLARIFIED HONEY.

Prepared by heating honey on a water-bath, skimming off the frothy scum which rises, and then straining.

Mellita.

MEDICATED HONEYS.

Honey of rose, honey of borax, oxymel, hydromel, and other mixtures in which honey takes the place of syrup, water, or other liquids, are "*mellita.*" They are useless preparations, liable to undergo fermentation, and easily replaced by syrups, which are in every respect preferable.

Hydromel is a mixture of thirty cubic centimeters (1 fluidounce) honey and two hundred and seventy cubic centimeters (9 fluidounces) boiling water.

Oxymel is a mixture of honey with acetic acid and water, "Oxymel Simplex" consisting of two hundred and forty grams (8 ounces) honey, thirty cubic centimeters (1 fluidounce) acetic acid, and thirty cubic centimeters (1 fluidounce) water.

Used in *coughs.*

Melilotus.

MELILOTUS.

Meliloti Summitates—Steinklee, Melilotenklee, G.; *Mélilot*, F.; *Meliloto, Trébol oloroso*, Sp.; *Meloten*, Sw.; *Sweet Clover.*

Origin.—*Melilotus officinalis*, Willdenow, and *Melilotus alba*, Lamarck (*Leguminosæ*).

Habitat.—Europe; naturalized in America.

Part used.—The flowering tops.

Description.—Stems angular, branched; leaves trifoliate, small, grayish-green. Flowers yellow (melilotus officinalis) or white (melilotus alba). Odor agreeable, aromatic, resembling that of tonka-beans; taste bitterish.

Should have a good color and aroma.

Constituents.—*Coumarin* (see "Dipterix").

Medicinal Uses.—Not employed internally. Sometimes applied externally, by dipping cloths in warm infusion, in local *pains*, etc.

MELILOTI EMPLASTRUM.

MELILOTUS PLASTER.

Melt sixty grams (2 ounces) resin, and sixty grams (2 ounces) yellow wax in a tin dish on a water-bath; add forty grams (1⅓ ounce) olive oil; stir well together; strain; while the mixture is still warm and liquid incorporate with it eighty grams (2⅔ ounces) finely powdered melilotus. When cold, roll the plaster into sticks about one and one-half centimeter (⅗ inch) in diameter.

Melissa; U. S.

MELISSA.

Melissæ Herba—Melissenblätter, Citronenkraut, G.; *Mèlisse, Céline, Herbe au Citron*, F.; *Citronmeliss*, Sw.; *Balm, Lemon Balm.*

Origin.—*Melissa officinalis*, Linné (*Labiatæ*).

Habitat.—Europe and America.

Parts used.—The leaves and tops.

Description.—Branches four-sided; leaves on the under side pale green, with a net-work of prominent veins, and beset with oil-glands; the flowers have whitish or purplish lips. Odor fragrant; taste aromatic, bitter.

Varieties.—CITRATA (Bischoff).—Agreeable lemon-like odor; branches and upper surface of leaves thinly hairy; under surface of leaves, smooth. This is the best kind.

VILLOSA (Bentham).—Larger; branches and both surfaces of the leaves with stiff hairs; the odor weak and inferior.

Constituents.—About one-fourth per cent. volatile oil, some tannin, and bitter extractive.

Medicinal Uses.—Similar to those of peppermint. Best given in infusion, or in the form of a FLUID EXTRACT made with diluted alcohol as a menstruum, of which latter preparation the **dose** is five to ten cubic centimeters (1 to 2½ fluidrachms).

MELISSÆ AQUA; G.

MELISSA WATER.

From five hundred grams (17⅔ avoirdupois ounces) of melissa leaves and a sufficient quantity of water make five liters (about 10½ pints) of melissa water by distillation.

MELISSÆ SPIRITUS COMPOSITUS.

CARMELITE SPIRIT.

Karmeliter Geist, G.

Mix sixty grams (2 ounces) melissa leaves, fifty grams ($1\frac{2}{3}$ ounce) lemon-peel, twenty-five grams ($\frac{3}{4}$ ounce) coriander, twenty-five grams ($\frac{3}{4}$ ounce) nutmeg, twelve grams ($\frac{3}{8}$ ounce) cinnamon, and twelve grams ($\frac{3}{8}$ ounce) cloves, cut or bruised as may be required; introduce the mixture into a pharmaceutical still; add seven hundred and twenty cubic centimeters (24 fluidounces) alcohol and one liter (34 fluidounces) water. Distil off nine hundred and forty cubic centimeters (32 fluidounces).

The French Codex adds to the above ingredients about eight grams (124 grains) angelica root.

Menispermum; U. S.

MENISPERMUM.

Menispermi Radix — Yellow Parilla, Canadian Moonseed.

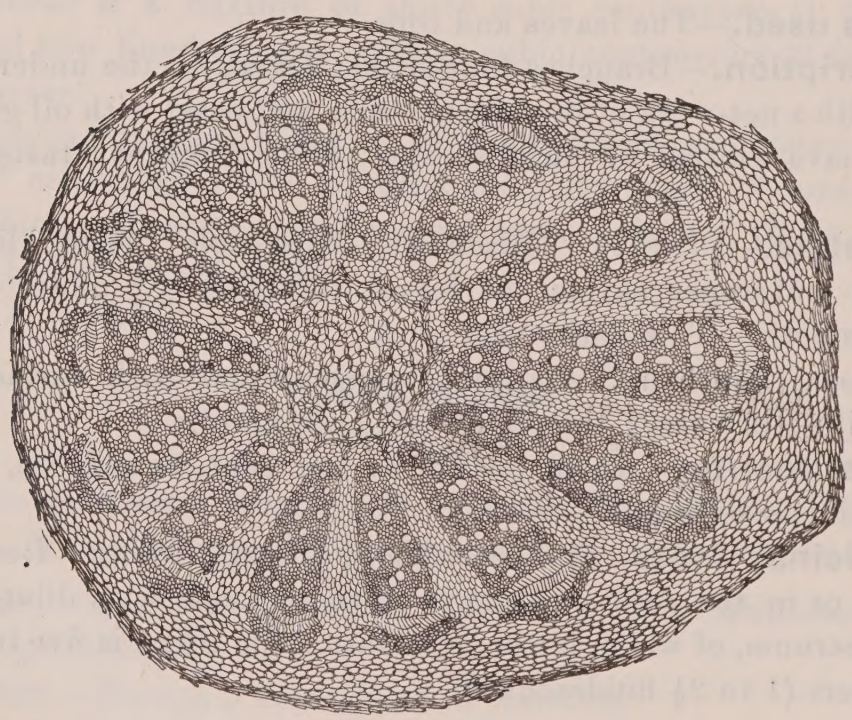


FIG. 380.—Menispermum, transverse section, enlarged.

Origin.—*Menispermum canadense*, Linné (*Menispermaceæ*).

Habitat.—Eastern United States.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 220.

Constituents.—Berberine ; also another alkaloid, which is white, soluble in ether and alcohol and in much water.

Medicinal Uses.—Yellow parilla is generally believed to resemble sarsaparilla in its action. It is an alterative tonic and diuretic, and, in large doses, laxative.

Dose.—One to four grams (15 to 60 grains) ; best given in the form of fluid extract.

MENISPERMI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF MENISPERMUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—One to four cubic centimeters (15 to 60 minims).

Mentha Crispa.

CURLED MINT.

Menthæ Crispæ Herba—Krauseminze, G. ; *Menthe crépue*, F. ; *Krusmynta*, Sw. ; *Crisped Mint.*

Origin.—*Mentha crispa*, Auctt. plur. (*Labiatæ*).

The Menthæ crispæ are : Mentha aquatica, Mentha verticillata, Mentha sativa, Mentha silvestris, and Mentha viridis—all cultivated.

Description.—They are called "crisped mint" or "curled mint" when the leaves, through the abnormal development of the parenchyma, by cultivation, assume a pitted, wrinkled form.

Constituents.—The same as in spearmint and peppermint. Crisped mint is somewhat astringent, containing an iron-greening tannin.

Uses and Dose—similar to those of peppermint.

Mentha Piperita ; U. S.

PEPPERMINT.

Menthæ Piperitæ Herba—Pfefferminze, G. ; *Menthe poivrée*, F. ; *Pepparmynta*, Sw.

Origin.—*Mentha piperita*, Linné (*Labiatæ*).

Habitat.—Cultivated in North America and Europe.

Parts used.—The leaves and tops.

Description.—The branches are four-sided, and frequently of purplish hue. Odor strong aromatic ; taste pungent, cooling.

Should have a good dark-green color and strong odor, and th coarser portions of the stems should be removed. The Pharmacopœi contemplates the use of only "the leaves and *tops*"—not the lower por tions of the stem.

Constituents.—About one per cent. of volatile oil.

Medicinal Uses.—Stimulant, carminative, antispasmodic. It in creases the appetite. Mint julep is the most popular form in whic peppermint is taken.

Dose.—Two to four grams (30 to 60 grains), in tea or in the form of fluid extract.

MENTHÆ PIPERITÆ INFUSUM.

INFUSION OF PEPPERMINT.

From fifty grams (about $1\frac{3}{4}$ avoirdupois ounce) of the drug mak five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Thirty cubic centimeters (1 fluidounce) or more, repeatedly

Menthæ Piperitæ Oleum ; U. S.

OIL OF PEPPERMINT.

Menthæ Piperitæ Ætheroleum—Volatile Oil of Peppermint.

Description and Tests.—See the Pharmacopœia, page 239.

Should have a pure, strong peppermint odor and taste. Owing t carelessness in the collection and garbling of the peppermint used fo distilling the volatile oil, the product is frequently contaminated wit the volatile oils of other plants, especially of Erigeron (fleabane) which imparts to it a disagreeable, coarse aroma.

Good oil of peppermint is colorless, or very nearly so.

The use of American oil of peppermint is not allowed by the Swed ish and Norwegian Pharmacopœias, on the supposition that all oil o peppermint distilled in this country is impure. It is, however, wel established that very fine oil of peppermint is made in the United States, and also that impure oil of peppermint is made in Europe a well as here.

Constituents.—The most interesting constituent is *menthol*, which see.

Used as a carminative in **doses** of one to three drops.

MENTHÆ PIPERITÆ AQUA; U. S.

Peppermint Water.

Prepared from one gram (15 grains) volatile oil of peppermint, using two grams (30 grains) cotton, and percolating five hundred cubic centimeters (17 fluidounces) of product as described under Aquæ Aromaticæ.

Peppermint water is an aromatic and slightly carminative vehicle for other medicines.

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce).

MENTHÆ PIPERITÆ ESSENTIA; B.

English Essence of Peppermint.

Prepared by mixing thirty cubic centimeters (1 fluidounce) volatile oil of peppermint and one hundred and twenty cubic centimeters (4 fluidounces) alcohol.

This preparation is about twice the strength of the spirit of peppermint of the U. S. Pharmacopœia, from which it also differs in being of a pale straw color instead of artificially colored green.

In the United States the name "Essence of Peppermint" is applied only to the "Spirit of Peppermint," the English essence not being used in this country.

Dose.—0.2 to 0.5 cubic centimeter (3 to 8 minims).

MENTHÆ PIPERITÆ ROTULÆ.

Peppermint Drops.

These are semi-transparent or entirely white sugar drops or cakes, saturated with a solution of oil of peppermint in ether. They contain rather less of the oil of peppermint than the *troches*, but are generally preferred to the latter.

MENTHÆ PIPERITÆ SPIRITUS; U. S.

Spirit of Peppermint.

Essence of Peppermint.

Mix one hundred grams (3 ounces 230 grains, or about $3\frac{3}{4}$ fluidounces) volatile oil of peppermint, ten grams (154 grains) coarsely powdered peppermint, and nine hundred grams (31 ounces 330 grains, or about 37 fluidounces) alcohol; macerate twenty-four hours; filter, add-

ing enough alcohol through the filter to make the total product weigh one thousand grams (35 ounces 120 grains, measuring about 40 fluidounces).

Spirit of peppermint is green, the color being due to chlorophyll dissolved out from the powdered herb that is added.

Dose.—0.3 to 1 cubic centimeter (5 to 15 minims).

MENTHÆ PIPERITÆ SYRUPUS.

SYRUP OF PEPPERMINT.

Dissolve eight hundred and fifty grams (29 ounces) sugar in five hundred cubic centimeters (17 fluidounces) peppermint water, without the aid of heat, and strain.

MENTHÆ PIPERITÆ TROCHISCI; U. S.

PEPPERMINT TROCHES.

Triturate together one gram (15 grains) volatile oil of peppermint and seventy-eight grams (1,200 grains) finely powdered sugar until intimately mixed; then add sufficient tragacanth mucilage, form a mass, and divide it into one hundred troches.

Mentha Viridis; U. S.

SPEARMINT.

Menthæ Viridis Herba—Römische Minze, Grüne Minze, G.; *Menthe Verte, Menthe Romaine, Baume Vert*, F.; *Grönmynta*, Sw.

Origin.—*Mentha viridis*, Linné (*Labiatæ*).

Habitat.—Cultivated and wild both in North America and Europe.

Parts used.—The leaves and tops only.

Description.—Branches light green; leaves without stalks. Odor aromatic; taste aromatic, pungent. Should be of good green color and good odor.

Constituents.—About one-half per cent. volatile oil.

Properties, etc.—Stimulant, carminative, antispasmodic.

Dose.—Two to four grams (30 to 60 grains) in the form of hot tea.

Menthæ Viridis Oleum; U. S.

OIL OF SPEARMINT.

Menthæ Viridis Ætheroleum—Volatile Oil of Spearmint.

Description and Tests.—See the Pharmacopœia, page 239. Resembles somewhat the oil of peppermint; but is of a more herb-like odor

and taste, and does not leave the characteristic cooling sensation produced by oil of peppermint.

The color of this volatile oil becomes reddish by age.

Oil of spearmint does not contain menthol.

Medicinal Uses.—Similar to those of oil of peppermint.

Dose.—0.2 to 0.3 cubic centimeter (3 to 5 minims).

MENTHÆ VIRIDIS AQUA; U. S.

SPEARMINT WATER.

Prepared from one gram (15 grains) volatile oil of spearmint, using two grams (30 grains) of cotton and collecting five hundred cubic centimeters (17 fluidounces) of percolate, as described under Aquæ Aromaticæ.

An aromatic vehicle for other remedies.

Dose.—One-half to one fluidounce (15 to 30 cubic centimeters).

MENTHÆ VIRIDIS SPIRITUS; U. S.

SPIRIT OF SPEARMINT.

Essence of Spearmint.

Mix one hundred grams (3 ounces 230 grains, or about 3¾ fluidounces) volatile oil of spearmint, ten grams (154 grains) coarsely powdered spearmint, and nine hundred grams (31 ounces 330 grains, or about 37 fluidounces) alcohol. Macerate twenty-four hours; filter, adding enough alcohol through the filter to make the total product weigh one thousand grams (35 ounces 120 grains, measuring about 40 fluidounces).

Has a green color.

Dose.—1.5 to 2.5 cubic centimeters (20 to 40 minims).

Menthol.

MENTHOL.

Peppermint Camphor, Chinese Oil of Peppermint, Japanese Oil of Peppermint.

This is a stearopten obtained from volatile oil of peppermint. It has the composition $C_{10}H_{20}O$, and occurs in small white or colorless prismatic crystals, having the odor and taste of the volatile oil, and is readily soluble in alcohol and in ether.

Medicinal Uses.—Menthol, dissolved in about ten or fifteen times its weight of oil of cloves, has been recommended as an external application in *neuralgia, sciatica*, etc.

Menyanthes.

MENYANTHES.

Menyanthæ Folia, Trifolium Aquaticum—Fieberklee, Bitterklee, Dreiblatt, G.; *Ményanthe, Trèfle d'eau (de marais)*, F.; *Trebol acuatico*, Sp.; *Vattenklöfver*, Sw.; *Buckbean, Bogbean, Marshtrefoil.*

Origin.—*Menyanthes trifoliata*, Linné (*Gentianaceæ*).

Habitat.—Europe; North America.

Part used.—The leaves. The leaves consist of a petiole, seventy-five to one hundred millimeters (3 to 4 inches) long, the leaflets fifty millimeters (2 inches) long, obovate, sessile, with crenate margin.

Description.—They are pale-green, scarcely wrinkled. Inodorous. Taste purely bitter.

Constituents.—A glucoside, called *menyanthin*, which is amorphous, yellowish; turpentine-like, or solid when dry; very bitter; readily soluble in boiling water and in alcohol; has a neutral reaction. The drug also contains an acrid substance which has not been isolated. There is no tannin in menyanthes.

Properties.—It is a pure bitter tonic; also said to be antiscorbutic, emmenagogue, vermifuge, febrifuge. In large doses purgative and emetic.

Best given in the form of FLUID EXTRACT, made with diluted alcohol, of which the **dose** is one to four cubic centimeters (15 to 60 minims).

A SOLID EXTRACT is also made, and given in the **dose** of 0.3 to 1 gram (5 to 15 grains).

Methysticum.

METHYSTICUM.

Mythystici Radix—Piper Methysticum, Ava Kava, Kava Kava, Ava.

Origin.—*Piper Methysticum* Forster (*Piperaceæ*).

Habitat.—The Sandwich and other Pacific islands.

Part used.—The root.

Description.—Large, grayish-brown externally, covered by a thin bark, under which is a network of woody tissue; internally pale yellowish, porous, frequently hollow, sometimes worm-eaten. Generally with rootlets attached, which are often braided. Odor somewhat fragrant; taste pungent, slightly astringent, bitter.

Constituents.—About two per cent. of soft acrid resin, a small quantity of pale-yellow volatile oil, and about one per cent. of a neutral crystalline principle called methysticin (or kavahin), which is obtained

by crystallization from a concentrated tincture. This methysticin is odorless and tasteless, in silky white needles, soluble in alcohol and ether, but insoluble in water. It is probably inert, as are cubebin, piperin (when pure) and other neutral crystalline principles found in

FIG. 381.—Ava-Kava, reduced to one-third linear size.

the piperaceæ. The medicinal properties of the drug seem to depend upon the resin and volatile oil.

Medicinal Uses.—Stimulant, diuretic, astringent, sialogogue, etc. It has been used in *bronchitis, rheumatism, gout, gonorrhœa, gleet*, etc.

Best given in FLUID EXTRACT made with alcohol as a menstruum, of which the **dose** is one to five cubic centimeters (15 to 75 minims).

Mezereum; U. S.

MEZEREUM.

Mezerei Cortex—Seidelbastrinde, Kellerhalsrinde, G.; *Écorce de Mézéréon* (*de garon, de lauréole, de thymélée*), F.; *Mecereon*, Sp.; *Tidebastbark*, Sw.; *Mezereon Bark.*

Origin.—*Daphne Mezereum*, Linné, and other species of *Daphne* (*Thymelaceæ*).

Habitat.—Northern Europe and Asia, in mountain regions.

Part used.—The bark.

Description.—See the Pharmacopœia, page 221. The powder is extremely irritating, and causes violent sneezing.

Constituents.—A soft, brown, acrid *resin*, which is soluble in alcohol and has a sweetish odor; also an acrid, rubefacient, *volatile oil;* and *daphnin*, which is a bitter glucoside in colorless crystals, scarcely soluble in cold solvents.

Medicinal Uses.—Seldom used alone, but mostly in combination with other remedies, as sarsaparilla, guaiacum, etc. It is considered to be a stimulant alterative in chronic, syphilitic, scrofulous, rheumatic, and cutaneous affections.

Dose.—0.3 to 1 gram (5 to 15 grains) best given in fluid extract.

MEZEREI EXTRACTUM; U. S.

EXTRACT OF MEZEREUM.

Moisten five hundred grams (17⅔ avoirdupois ounces) of mezereum, in No. 20 powder, with two hundred grams (8⅓ fluidounces) alcohol. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate. Reserve four hundred and fifty grams (about 15 fluidounces) of *first percolate.* Continue percolation to exhaustion. Evaporate the second percolate to fifty grams (about 1⅔ ounce). Mix this with the first percolate, and evaporate the whole to extract.

Brown. Yield about fourteen per cent.

Used externally only, in liniments and ointments.

MEZEREI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF MEZEREUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Moisten the drug with two hundred grams (about 8⅓ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.3 to 1 cubic centimeter (5 to 15 minims).

MEZEREI UNGUENTUM; U. S.

MEZEREUM OINTMENT.

Mix eighty grams (2 ounces 360 grains) lard and twelve grams (185 grains) yellow wax by melting them together over a water-bath. Add twenty-five grams (386 grains, measuring about 1 fluidounce) fluid extract of mezereum, and stir the whole until the alcohol has entirely evaporated, after which remove the ointment from the source of heat and continue stirring it until cool.

Used as a stimulant application to *indolent ulcers*.

Micromeria.

MICROMERIA.

Micromeriæ Herba—Yerba Buena.

Origin.—*Mikromeria Douglassii*, Bentham (*Labiatæ*).

Habitat.—California.

Part used.—The whole plant.

Description.—A slender, creeping stem; opposite, nearly round leaves, and small purple flowers. Odor aromatic; taste aromatic, somewhat pungent.

Constituent.—Volatile oil.

Properties.—Aromatic, stimulant.

Dose.—One to five grams (15 to 75 grains) in FLUID EXTRACT, prepared from the finely powdered drug, and using alcohol as a menstruum.

Mikania.

MIKANIA.

Mikaniæ Folia—Guaco Leaves.

Origin.—*Mikania Guaco*, Willdenow (*Compositæ*).

Habitat.—South America; West Indies.

Part used.—Leaves.

Description.—Oval, rounded at the ends, covered with rusty, matted, woolly hairs on the under surface. They are usually mixed with a large quantity of the stems, as seen in the trade. They have an aromatic, bitter taste.

Constituent.—A little volatile oil.

Properties and Uses.—Similar to those of boneset. The drug is used by natives of South America as an antidote against poisonous *snake-bites*. It has been recommended also for *hydrophobia*, etc.

Dose.—Two to five grams (30 to 75 grains). Average dose about two grams (30 grains). Best represented by the FLUID EXTRACT made with diluted alcohol.

Mitchella.

MITCHELLA.

Michellæ Herba—Squaw Vine, Partridgeberry, Checkerberry, Winter Clover.

Origin.—*Mitchella repens* Linné (*Rubiaceæ*).

Habitat.—North America.

Part used.—The whole plant.

Description.—An evergreen with branched stem, about twenty-five to thirty centimeters (10 to 12 inches) long, entire roundish-ovate, dark green leaves, about twelve millimeters ($\frac{1}{2}$ inch) long, frequently marked by white lines. Flowers small, white, or pale purplish, fragrant. The fruit is a small, dry, scarlet-red berry. The leaves are inodorous, bitter, somewhat astringent.

Constituents.—No analysis.

Medicinal Uses.—Mitchella is reputed to be diuretic, tonic, astringent, and parturient. As the name "squaw vine" indicates, this drug is used in complaints of females, as in *amenorrhœa*, *dysmenorrhœa*, *menorrhagia*, etc. It is said to facilitate labor if given for some time before expected labor, and is also used in *dropsy*, *suspension of urine*, and other derangements of the uterine and urinary organs.

Best given in the form of FLUID EXTRACT made with diluted alcohol, the **dose** of which is two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Misturæ.

MIXTURES.

Mixturæ.

The preparations classed under this head are chiefly compounds which cannot be included with the solutions, tinctures, or any other characteristic and distinct pharmaceutical group. They consist mainly of insoluble substances, merely suspended in liquid by the aid of viscid excipients. In the U. S. Pharmacopœia the emulsions made from gum-resins, together with almond emulsion, etc., are called mixtures. See also article on Emulsions.

Monesia.

MONESIA.

Monesiæ Extractum.

Origin.—*Chrysophyllum glycyphlœum*, Casaretti (*Sapotaceæ*).

Habitat.—Brazil.

Drug.—An extract probably prepared by boiling the bark with water and evaporating the decoction to dryness.

Description.—A dark-brown, dry extract, either in cakes, or friable angular pieces, soluble in water, inodorous, sweetish, astringent, somewhat acrid.

Constituents.—Over fifty per cent. of tannin, an acrid principle called *monesin*, which resembles saponin, a sweet principle resembling glycyrrhizin, and other substances of less importance.

Properties.—Astringent, tonic, stimulant.

Dose.—0.3 to 1.5 gram (5 to 20 grains).

Substitutions.—Kino and extract of logwood have been sold for monesia.

Morphina; U. S.

MORPHINE.

Morphia, Phar. 1870; *Morphium*, *Morphinum*.

An alkaloid contained in and prepared from opium.

Description and Tests.—See the Pharmacopœia, page 225.

Medicinal Uses.—The salts of morphine are used for the same purposes as opium. These preparations are generally preferred to other opiates for relieving *pain* and for subcutaneous injection.

The alkaloid morphine is seldom used as such.

Dose.—About 0.01 gram ($\frac{1}{6}$ grain).

MORPHINÆ OLEATUM.

OLEATE OF MORPHINE.

Triturate 0.50 gram (7½ grains) morphine (alkaloid) to fine powder and dissolve this in 9.50 grams (146½ grains) oleic acid by the aid of gentle heat.

This preparation darkens soon. It contains five per cent. of the alkaloid, which makes it sufficiently strong.

Used externally in *neuralgia*, etc.

Morphinæ Acetas; U. S.

ACETATE OF MORPHINE.

Description and Tests.—See the Pharmacopœia, page 225.

It easily parts with a portion of its acetic acid, becoming partially insoluble in water and finally assuming a brownish color. Should, therefore, be kept in tightly corked bottles.

Solutions of acetate of morphine soon spoil, a slimy sediment being formed in them.

Dose.—About 0.01 gram (⅙ grain).

Morphinæ Citratis Liquor.

SOLUTION OF CITRATE OF MORPHINE.

A solution of citrate of morphine containing one-half grain morphine in each fluidrachm has been in use for many years in the District of Columbia. It is made as follows: 40 centigrams (6 grains) morphine (the alkaloid), twenty centigrams (3 grains) citric acid, and one centigram (⅙ grain) cochineal are triturated with thirty centigrams (6 minims) alcohol and twenty-two cubic centimeters (6 fluidrachms) water, until perfect solution of the morphine is effected. Filter.

The object of coloring this solution red is to prevent possibly taking the wrong bottle if several morphine solutions are kept together. It keeps very well.

Dose.—One to two cubic centimeters (15 to 30 minims) which is equivalent to about one-eighth to one-fourth grain of morphine.

Morphinæ Hydrochloras; U. S.

HYDROCHLORATE OF MORPHINE.

Morphiæ Murias—Muriate of Morphine, Chloride of Morphine.

Description and Tests.—See the Pharmacopœia, page 226. More readily soluble in water and in alcohol than the sulphate.

Dose.—About 0.01 gram (⅙ grain).

Morphinæ Sulphas; U. S.

SULPHATE OF MORPHINE.

Morphiæ Sulphas, Phar. 1870.

Description and Tests.—See the Pharmacopœia, page 226.

Dose.—About 0.01 gram ($\frac{1}{6}$ grain).

MORPHINÆ ET IPECACUANHÆ TROCHISCI; U. S.

TROCHES OF MORPHINE AND IPECAC.

Triturate together until thoroughly mixed 0.16 gram ($2\frac{1}{2}$ grains) sulphate of morphine, 0.50 gram (8 grains) ipecac in fine powder, and sixty-five grams (1,000 grains) finely powdered sugar. Then incorporate 0.06 gram (1 grain) volatile oil of gaultheria, and finally enough tragacanth mucilage to form a proper mass, from which make one hundred troches.

Used in *coughs* and *colds.*

MORPHINÆ PULVIS COMPOSITUS; U. S.

COMPOUND MORPHINE POWDER.

Tully's Powder.

Triturate three grams (46 grains) camphor with a few drops of alcohol until reduced to powder; then add three grams (46 grains) powdered glycyrrhiza, and three grams precipitated carbonate of calcium, and continue the trituration until the whole is uniformly intimately mixed. Then remove the powder from the mortar; put in the latter fifteen centigrams ($2\frac{1}{3}$ grains) sulphate of morphine, add gradually the powder prepared as described above, and mix intimately by trituration.

Dose.—About 0.5 gram (8 grains).

Morphinæ Tartras.

MORPHINE TARTRATE.

In appearance this morphine salt resembles the sulphate. It is readily soluble in water, and its solution is more permanent and less irritating than that of the other salts of morphine, for which reasons it is preferable for use in hypodermic injections.

Dose.—About 0.01 gram ($\frac{1}{6}$ grain).

Morrhuæ Oleum ; U. S.

Cod-Liver Oil.

Oleum Jecoris Aselli—Leberthran, Stockfischleberthran, G.; *Huile de morue, Huile de foie de morue*, F. ; *Aceite de higado de bacalao*, Sp. ; *Fisklefvertran*, Sw. ; *Cod Oil.*

Origin.—*Gadus Morrhua*, Linné and other species of *Gadus* (*Pisces*).

Description and Tests.—See the Pharmacopœia, page 239. The best cod-liver oil is that which contains the largest proportion of olein, and therefore congeals at a lower temperature. An article which deposits a large quantity of solid granular fat at about 0° C. (32° F.) is of inferior quality. The color should be very pale, and the oil perfectly clear and free from sediment. Good oil is nearly odorless, and quite bland.

Medicinal Uses.—Cod-liver oil is a valuable article of diet in wasting diseases, as in *consumption, caries, excessive purulent discharges*, etc. Also of great benefit in *scrofula* and *scrofulous complaints.*

It probably exerts no direct curative properties, but is a fat that is more easily assimilated than others, and therefore preferable for internal use.

Dose.—From a teaspoonful to a tablespoonful, best given in emulsion, flavored with bitter almond oil, etc. It may be given in gelatine capsules or wafers.

MORRHUÆ OLEUM FERRATUM.

Ferrated Cod-Liver Oil.

Dissolve ten grams (154 grains) benzoate of iron in one thousand cubic centimeters (34 fluidounces) cod-liver oil by the aid of gentle heat and frequent agitation.

The preparation is a clear reddish-brown liquid.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms) three times a day.

MORRHUÆ OLEUM FERRATUM CUM QUININA.

Cod-Liver Oil with Iron and Quinine.

Dissolve ten grams (154 grains) benzoate of iron and ten grams oleate of quinine in one thousand cubic centimeters (34 fluidounces) cod-liver oil, by the aid of gentle heat and frequent agitation.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms) several times a day.

MORRHUÆ OLEUM CUM QUININA.

Cod Liver Oil with Quinine.

Dissolve ten grams (154 grains) quinine in one thousand cubic centimeters (34 fluidounces) cod-liver oil by the aid of gentle heat, shaking frequently.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms) several times a day.

MORRHUÆ EMULSIO.

Cod-Liver Oil Emulsion.

Put one hundred grams (3 ounces 230 grains) yolk of eggs into a Wedgewood mortar and triturate it until reduced to a smooth paste; then add one hundred and twenty cubic centimeters (4 fluidounces) glycerin and mix thoroughly. Then add 0.10 cubic centimeter (2 drops) volatile oil of bitter almond and three hundred cubic centimeters (10 fluidounces) cod-liver oil, and triturate briskly until thoroughly mixed, after which add gradually, and during uninterrupted and rapid trituration, two hundred and forty cubic centimeters (8 fluidounces) orange-flower water, continuing the stirring until a perfect emulsion is obtained. Now add three hundred cubic centimeters (10 fluidounces) good Jamaica rum, pour the whole into a half-gallon bottle, and shake thoroughly for several minutes.

This emulsion of cod-liver oil is as palatable as any we have seen; it keeps very well, and can scarcely be improved upon in any practical sense.

Dose.—About fifteen cubic centimeters ($\frac{1}{2}$ fluidounce).

MORRHUÆ EMULSIO CUM CALCII LACTOPHOSPHATE.

Cod-Liver Oil with Lactophosphate of Lime.

Mix twenty grams (308 grains) precipitated phosphate of calcium with ninety cubic centimeters (3 fluidounces) water; add sufficient hydrochloric acid to dissolve the phosphate. Add next a sufficient quantity of water of ammonia to reprecipitate the phosphate of calcium. Wash the precipitate well, and let it drain. Dissolve it in thirty cubic centimeters (1 fluidounce) lactic acid, diluted with two hundred and ten cubic centimeters (7 fluidounces) orange-flower water. Filter the solution, and then add enough orange-flower water to make the whole measure five hundred cubic centimeters (17 fluidounces).

Put one hundred grams (3 ounces 230 grains) yolk of eggs in a Wedgewood mortar and triturate it until reduced to a smooth paste, add ninety cubic centimeters (3 fluidounces) glycerin, and mix well. Then add gradually three hundred cubic centimeters (10 fluidounces) cod-liver oil and triturate the whole until thoroughly mixed. Finally add, a little at a time, and during brisk and constant trituration, the solution of lactophosphate of lime, prepared as described above, and continue stirring until a perfect emulsion is obtained. To this add four cubic centimeters (1 fluidrachm) spirit of bitter almond, pour the whole into a half-gallon bottle, and shake well for several minutes.

Dose.—About fifteen cubic centimeters ($\frac{1}{2}$ fluidounce).

MORRHUÆ EMULSIO FERRATA.

FERRATED COD-LIVER OIL EMULSION.

Dissolve five grams (77 grains) pyrophosphate of iron in fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) boiling water. Add this solution to one thousand cubic centimeters (34 fluidounces) cod-liver oil emulsion, and shake well.

Dose.—About fifteen cubic centimeters ($\frac{1}{2}$ fluidounce).

MORRHUÆ EMULSIO PHOSPHATICA.

PHOSPHATIC COD-LIVER OIL EMULSION.

Mix thoroughly sixty cubic centimeters (2 fluidounces) diluted phosphoric acid and twelve hundred cubic centimeters (40$\frac{1}{2}$ fluidounces) cod-liver oil emulsion, shaking them well together for several minutes.

Dose.—About 15 cubic centimeters ($\frac{1}{2}$ fluidounce).

Moschus; U. S.

MUSK.

Moschus, G.; *Musc*, F.; *Almizcle*, Sp.; *Mysk*, Sw.

A concrete substance formed from the secretions from the preputial follicles of the male of *Moschus moschiferus*, Linné (*Mammalia*).

The musk sac is, in the living animal, situated between the navel and the genitals, but nearer the latter, between the skin and the muscles of the abdomen. It is oval, somewhat flattened, three to five centimeters (1$\frac{1}{5}$ to 2 inches) in diameter, and fifteen to twenty-five millimeters ($\frac{3}{5}$ to 1 inch) thick. That side of the sac which, in the living

animal, was lying against the abdominal muscles, is in the dried drug flat and bare, while the opposite side is rounded and covered with a piece of hairy skin which was cut off, together with the gland itself, in taking the musk from the animal. The hairs are thick, stiff, yellowish or whitish, arranged in a whorl, but usually cut off short.

"Musk in pods," which means the genuine musk in the unopened sacs, is the only kind to be used in medicine. It comes from China, in little square boxes made of thin wood, covered with silk on the outside and lined internally with lead, each box containing usually twenty-four "musk pods," each pod being wrapped separately in paper. The weight of each musk pod is from fifteen to thirty-five grams ($\frac{1}{2}$ to $1\frac{1}{6}$ ounce). The actual musk itself, contained in each sac, weighs from four to twenty grams (60 to 130 grains).

Musk is composed of roundish grains of irregular size ; dark reddish brown ; of a somewhat greasy polish ; a peculiar, penetrating, remarkably persistent odor ; and a disagreeable bitter taste. Cold water dissolves from one-half to three-fourths, hot water nearly four-fifths, diluted alcohol about one-half, and strong alcohol only about one-tenth of the weight of the musk. The alcoholic solution is light sherry-colored, and becomes turbid on the addition of water. The watery solution of musk is dark brown, has a strong odor, and gives a neutral or faintly acid reaction. When incinerated, musk leaves from five to eight per cent. of gray ash.

When thoroughly dried the musk loses its odor. This returns, however, on moistening the drug. The odor is also removed by trituration with camphor, or with preparations containing hydrocyanic acid.

Varieties.—Chinese (Tonquin or Thibet) musk is the best kind. The Russian (or Siberian) variety is usually inferior, and sometimes has an extremely offensive although not so persistent or strong odor. Russian musk pods are elongated, and covered with paler and softer hairs.

Adulterations.—Owing to the high price of musk it is often adulterated, even "in pods." Shot or small pieces of lead are introduced through the orifice of the gland or the sacs are opened, portions of the contents removed, and foreign substances, such as dried meat, blood, etc., introduced instead. It is said that the entire pod has been imitated. These falsifications are, however, exceedingly difficult, if not impossible, to be perpetrated without detection by fairly careful examination.

"Grain musk," however, is more frequently tampered with, owing to the greater difficulty of detection in such cases. In fact "Chinese musk" (?) in one-ounce tins is offered at about one-twentieth the price

of "Tonquin musk" in pods; and "Tonquin musk in grain," meaning musk directly from the pod, is worth more than twice as much as musk in pods.

Musk is prescribed in doses of about 0.50 gram (8 grains), and is, therefore, an exceedingly expensive medicine.

Constituents.—Bitter resinous matter, ammonia, fat, cholesterin, etc. The odorous principle has not been isolated ; it is probably a product of decomposition constantly being formed.

Uses.—Musk is used in perfumery, having, when largely diluted, an odor which to many is quite agreeable, and having the power to fix or render more lasting and delicate any evanescent perfumes of other substances.

Medicinal Uses.—A powerful stimulant and antispasmodic, useful in the *typhoid conditions* of various diseases, when accompanied by subsultus tendinum, muttering delirium and hiccough, and in collapse. Also useful in *chorea*, *hysteria*, *whooping-cough*, etc.

Dose.—0.5 gram (8 grains) or more, every two or three hours, best given in mixture as described below.

MOSCHI MISTURA.

Musk Mixture.

Emulsio Moschi—Musk Julep.

Triturate one gram (15 grains) musk with three grams (45 grains) sugar until reduced to fine powder and intimately mixed ; then add three grams powdered gum arabic and finally one hundred cubic centimeters (3⅓ fluidounces) rose water, added gradually and with constant trituration. This is a good form of administration of musk.

Dose.—Fifteen to thirty cubic centimeters (½ to 1 fluidounce), repeated.

MOSCHI TINCTURA; U. S.

Tincture of Musk.

Triturate thirty grams (1 ounce 25½ grains) musk with fifteen cubic centimeters (½ fluidounce) water until reduced to a smooth mixture, and then add gradually one hundred and twenty cubic centimeters (4 fluidounces) more water. Transfer the whole to a pint bottle, and add one hundred and thirty-five grams (4 ounces 333 grains, or 5¾ fluidounces)

alcohol. Macerate seven days, shaking occasionally. Filter. Add enough diluted alcohol through the filter to make the whole weigh three hundred grams (10 ounces 255 grains, measuring about 11 fluidounces).

Dose.—One to five cubic centimeters (15 to 75 minims).

Moxæ.

MOXAS.

Conical or cylindrical bodies formed from cotton impregnated with solution of nitrate of potassium and dried. They have also been made from other substances. Moxas are used as a cautery, being placed on that spot of the body which is to be burnt, after which they are ignited and burn evenly and rapidly, the fire finally coming in direct contact with the skin.

FIG. 382.—Moxa, showing size.

Used as powerful counter-irritants in *neuralgias*, *sciaticas*, etc.

Mucilagines.

MUCILAGES.

Solutions of gum or vegetable mucilage in water. Mucilage of acacia, mucilage of tragacanth, and mucilage of quince are typical mucilages. Starch paste is also called a mucilage, although it does not contain gum or mucilage, because it resembles the mucilages in being viscid and more or less adhesive.

Used as demulcent vehicles for other remedies.

Mucuna.

MUCUNA.

Mucunæ Setæ—Cowhage.

Origin.—*Mucuna pruriens* De Candolle (*Leguminosæ*).

Habitat.—East and West Indies.

Part used.—The hairs from the pods.

Description.—About three millimeters ($\frac{1}{8}$ inch) long, straight, pointed, brown.

They penetrate the skin very readily and cause severe itching, which is aggravated by rubbing. The form of the hairs is seen in Fig. 383.

Medicinal Uses.—Formerly used as a vermifuge. Now seldom used, and probably entirely worthless. It is said to be used by dishon-

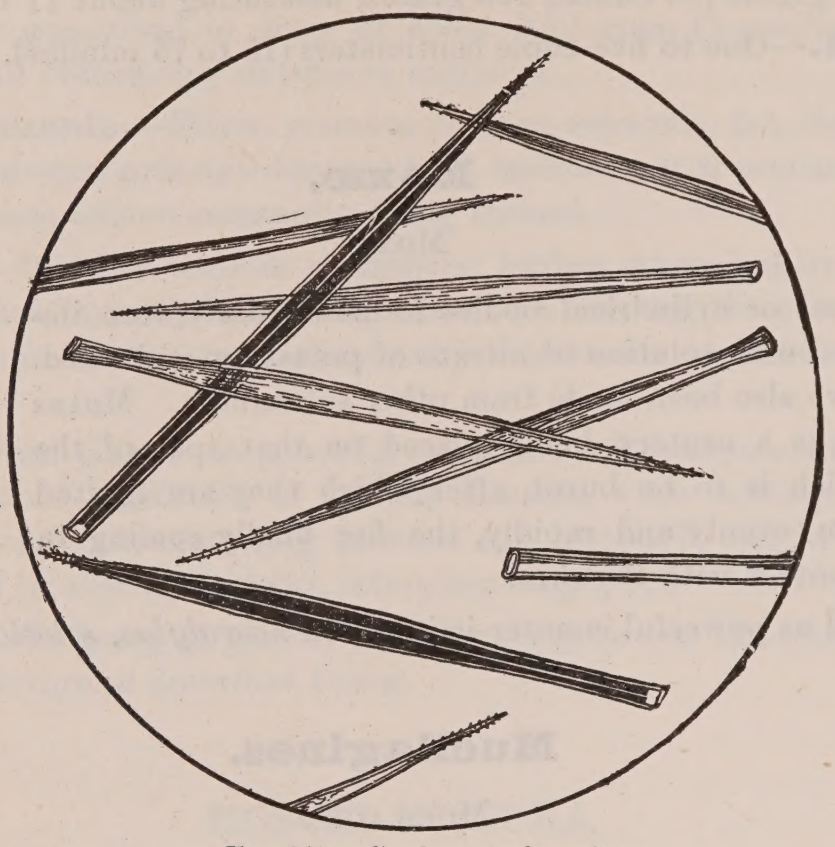


FIG. 383.—Cowhage, enlarged.

est horse-traders to make horses appear spirited, by applying it to the anus or genitals.

Myrciæ Oleum; U. S.

OIL OF MYRCIA.

Myrciæ Ætheroleum — Volatile Oil of Myrcia, Oil of Bay.

Origin.—Distilled from the leaves of *Myrcia acris*, De Candolle (*Myrtaceæ*).

Description.—See the Pharmacopœia, page 239. The odor slightly resembles that of allspice.

Uses.—Only employed as a perfume.

MYRCIÆ SPIRITUS; U. S.

SPIRIT OF MYRCIA.

Spirit of Bay, Bay Rum.

Mix sixteen grams (247 grains) oil of myrcia, one gram (15 grains) oil of orange peel, one gram (15 grains) oil of pimenta, and one thousand grams (35 ounces 120 grains, measuring 42 fluidounces) alcohol.

Then add gradually seven hundred and eighty-two grams (26½ fluidounces) water, shake well, set it aside in a tightly corked bottle for a week, and then filter.

Used as a toilet article, and as a wash in *headaches*, etc.

Myrica.

MYRICA.

Myricæ Cortex—Bayberry Bark.

Origin.—*Myrica cerifera*, Linné (*Myricaceæ*).

Habitat.—Along the North American Atlantic coast.

Part used.—The bark.

Description.—Quills or troughs about one and a half millimeter (1/16 inch) thick, externally whitish, middle bark reddish-brown, the inner side also brownish. Odor, when the drug is powdered, aromatic; taste pungent, aromatic, astringent.

Constituents.—Volatile oil and acrid resin.

Medicinal Uses.—Stimulant and astringent; useful in relaxed conditions of the mucous membranes. This remedy is said to have been successfully employed in *dysentery*, *diarrhœa*, etc.

Externally the infusion or diluted fluid extract may be used as a wash, gargle, or injection in various affections, as in *sore-throat*, *leucorrhœa*, *ulcers*, etc.

Best given in form of fluid extract.

MYRICÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF MYRICA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

MYRICÆ PULVIS COMPOSITUS.

COMPOUND POWDER OF MYRICA.

"*Composition Powder.*"

Mix six hundred grams (21 ounces 72 grains) bayberry bark, three hundred grams (10 ounces 255 grains) ginger, fifty grams (1 ounce 334 grains) capsicum, and fifty grams cloves, all in fine powder.

Dose.—One to four grams (15 to 60 grains).

Myristica; U. S.

NUTMEG.

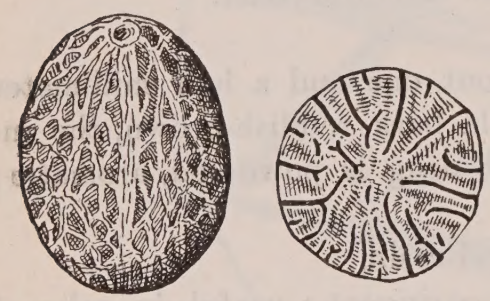
Myristicæ Semina—Muskatnuss, G.; *Muscade, Noix de muscade*, F.; *Nuez moscada*, Sp.; *Muskot*, Sw.

Origin.—*Myristica fragrans*, Houttuyn (*Myristicaceæ*).

Habitat.—India, the Philippines, the Banda Islands, West Indies, South America.

Part used.—The kernel of the seed with the testa (seed coat) removed.

Description.—See the Pharmacopœia, page 228. Should be large (about 25 millimeters, or 1 inch long), heavy, sound, and strongly fragrant.



FIGS. 384, 385.—Nutmeg, whole and transverse section, natural size.

Varieties.—*Limed or Dutch nutmegs* are covered with a white powder, having been treated with lime.

Penang and Singapore nutmegs are not limed, and hence darker-looking exteriorly, not being covered with a white powder.

Constituents.—From two to eight per cent. volatile oil, and from twenty-five to thirty per cent. fixed oil, besides starch, etc.

Medicinal Uses.—A spicy and stimulant carminative. Mainly used in combination with stomachics and bitters.

Dose.—0.5 to 1.5 gram (8 to 22 grains).

Myristicæ Oleum; U. S.

OIL OF NUTMEG.

Myristicæ Ætheroleum — Volatile Oil of Nutmeg.

The volatile oil distilled from nutmeg.

Description.—See the Pharmacopœia, page 240.

It is to be regretted that no distinction is made in the pharmacopœial nomenclature between the official volatile oil of nutmeg and the fixed oil of nutmeg which is common in the trade.

Medicinal Uses.—Carminative in doses of two or three drops.

MYRISTICÆ SPIRITUS; U. S.

SPIRIT OF NUTMEG.

Mix three grams (46 grains) volatile oil of nutmeg and ninety-seven grams (3 ounces 185 grains, measuring 4 fluidounces) alcohol.

Sometimes employed for flavoring.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Myristicæ Oleum Expressum.

EXPRESSED OIL OF NUTMEG.

Nutmeg Butter—Fixed Oil of Nutmeg.

The fixed oil of nutmeg obtained by expression.

Description.—Yellowish brown, of the consistence of soft tallow or butter, fragrant, soluble in four times its weight of boiling alcohol.

Occasionally used internally. Bland and unirritating.

MYRISTICÆ CERATUM; G.

NUTMEG CERATE.

The German Pharmacopœia prescribes one ounce yellow wax, two ounces olive oil, and six ounces fixed (expressed) oil of nutmeg. Melt the wax and olive oil together. Then remove from the source of heat and add the oil of nutmeg.

Used as a warming application to the abdomen in infantile bowel complaints.

Myrrha; U. S.

MYRRH.

Myrrha Gummi-Resina—Myrrhe, G. and F.; *Mirra*, Sp.; *Myrrha*, Sw.

Origin.—*Balsamodendron Myrrha*, Nees (*Burseraceæ*).

Habitat.—Eastern Africa and Southwestern Arabia.

Description.—See the Pharmacopœia, page 228. Clean, semi-transparent pieces ought always to be selected for medicinal use. The Pharmacopœia expressly rejects dark pieces, and admixtures recognized by complete solubility in alcohol (resins) or by their swelling in water (gums). Of good myrrh water dissolves about sixty per cent.; alcohol about twenty-five per cent. or much more.

Constituents.—From two to four per cent. volatile oil (myrrhol), from twenty-five to forty per cent. resin (myrrhin), and forty to sixty per cent. gum; also some bitter principle.

Medicinal Uses.—Myrrh is tonic, stimulant, and blennorrhetic. It is often used in combination with iron in *anæmia, amenorrhœa, chronic bronchitis, bronchorrhœa*, etc.

Dose.—0.5 to 2 grams (8 to 30 grains).

MYRRHÆ TINCTURA; U. S.

TINCTURE OF MYRRH.

Macerate sixty grams (917 grains) myrrh in moderately coarse powder with two hundred and fifty gram (about 10 fluidounces) alcohol for seven days in a tightly corked bottle, shaking frequently. Filter through paper, adding enough alcohol through the filter to make the filtrate weigh three hundred grams (10 ounces 250 grains, measuring about 12 fluidounces).

This tincture is brownish yellow, and becomes paler by age.

Seldom used internally. Externally it is used as a wash in *freckles*, or as a mouthwash in *spongy gums*, *relaxed uvula*, etc.

Dose.—One to four cubic centimeters (15 to 60 minims).

MYRRHÆ ET CAPSICI TINCTURA.

TINCTURE OF MYRRH AND CAPSICUM.

("*Hot Drops*;" "No. 6.")

Macerate thirty grams (1 ounce) powdered capsicum, and sixty grams (2 ounces) coarsely powdered myrrh, with one thousand cubic centimeters (34 fluidounces) alcohol for a week. Filter, adding enough alcohol through the filter to make the whole filtrate measure one thousand cubic centimeters (34 fluidounces).

Used in *diarrhœas*, *typhoid conditions*, *gastric irritability* of drunkards, etc.

Dose.—Two to four cubic centimeters ($\frac{1}{2}$ to 1 fluidrachm).

Nectandra.

NECTANDRA.

Nectandræ Cortex—Bebeeru Bark.

Origin.—*Nectandra Rodiæi*, Schomburgh (*Lauraceæ*).

Habitat.—British Guiana.

Part used.—The liber.

Description.—Flat pieces, or troughs, thirty to sixty centimeters (1 to 2 feet) long, ten to fifteen centimeters (4 to 6 inches) broad, and about six millimeters ($\frac{1}{4}$ inch) thick, heavy, hard, brittle, externally grayish-brown, on the inner side cinchona-brown; inodorous; taste bitter, astringent.

Constituents.—*Beberine*—an alkaloid soluble in alcohol and in

ether, and stated to be identical with the *buxine* of the boxwood, and the *pelosine* of pareira brava.

Medicinal Uses.—A bitter tonic and stomachic. Best given as fluid extract.

NECTANDRÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF NECTANDRA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—Five to ten cubic centimeters (1¼ to 2½ fluidrachms).

Neroli Oleum.

OIL OF NEROLI.

Neroli Ætheroleum — Volatile Oil of Neroli.

Origin.—Distilled from the flowers of *Citrus Aurantium* and *Citrus vulgaris*, Risso (*Aurantiaceæ*).

Description.—Pale brownish-yellow, having a peculiar fragrant odor, and a bitter aromatic taste. When mixed with alcohol it exhibits a bright violet fluorescence.

It is obtained in the distillation of orange-flower water, but is not the same volatile oil as that contained in that water.

Oil of neroli is said to be very frequently adulterated with oil of bergamot and oil of orange leaves.

Used only in perfumes.

NEROLI SPIRITUS.

SPIRIT OF NEROLI.

Mix five cubic centimeters (78 minims) oil of neroli and two hundred and fifty cubic centimeters (10½ fluidounces) alcohol.

Nicotina.

NICOTINE.

Nicotia.

Origin.—*Nicotiana Tabacum*, Linné (*Solanaceæ*).

An alkaloid obtained from tobacco. It is a colorless, transparent, mo-

bile liquid, which has a strong odor of tobacco, especially when warmed, and a persistent, acrid, burning taste. It has 1.027 specific gravity, is readily soluble in water, alcohol, and ether, and has a strongly alkaline reaction.

Nicotine is a powerful poison, depressing the heart's action and producing great prostration, which may result in death after over-doses. Not used medicinally in this form.

Nitrogenii Monoxidum.

NITROUS OXIDE.

Laughing Gas.

A colorless gas obtained by heating *pure* ammonium nitrate gradually to about 200° C. (392° F.) when it decomposes, and as the heat is slowly increased yields water and nitrous oxide. The gas is washed by passing it through tepid water.

It has a slight odor and a sweetish taste. One liter of it at 0° C (32° F.) weighs 1.97 gram. It supports combustion, and, for a brief period respiration. By pressure and cold it can be liquefied, and even solidified. The liquid, as well as the solid crystalline form, are colorless.

Compressed liquid nitrous oxide is manufactured in iron cylinders for dentists' use.

Medicinal Uses.—Employed as an anæsthetic inhalation in operations of short duration, as *drawing of teeth*, *opening abscesses*, etc.

Nitroglycerinum.

NITROGLYCERIN.

Trinitroglycerin—Glonoin.

Prepared by slowly adding glycerin to a mixture of strong nitric and sulphuric acids, being careful to keep the temperature below 26.6° C. (80° F.); then pouring the mixture into a large volume of water, and afterward washing the oily liquid, which separates, with a dilute solution of alkali.

Description.—It is a colorless or pale yellowish oily liquid of 1.60 specific gravity. In cold it crystallizes in long needles. It is odorless, and has a sweet, aromatic, pungent taste. Its vapors cause severe headache. Ignited in the open air it burns incompletely. Heated in closed vessel, or ignited by percussion, it explodes with terrible violence. When long kept, it gradually decomposes and might explode.

A solution containing one per cent. nitroglycerin, dissolved in alcohol, is used medicinally.

Medicinal Uses.—Nitroglycerin has been used in functional nervous disturbances, *headache, angina pectoris,* etc.

Dose.—One drop of a one per cent. solution, largely diluted.

Nux Vomica; U. S.

NUX VOMICA.

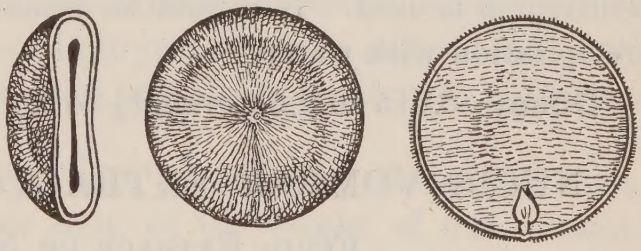
Nucis Vomicæ Semina—Krähenaugen, Brechnuss, G.; *Noix vomiques,* F.; *Nuez Vomica,* Sp.; *Räfkakor,* Sw.; *Poison Nut, Quaker Buttons.*

Origin.—*Strychnos Nux-vomica,* Linné (*Loganiaceæ*).

Habitat.—East India.

Part used.—The seeds.

Description.—See the illustrations. They are grayish or greenish-gray, and have a silky lustre from soft hairs. The interior of the seed is grayish-white, horny, exceedingly tough and difficult to powder. Odor none; taste intensely and persistently bitter.



FIGS. 386–388.—Nux Vomica, whole, and sections parallel and at right angles to surface, showing embryo and cavity in seed; all natural size.

Constituents. — From one-fourth to three-fifths per cent. *strychnine;* and one-half to one per cent. *brucine,* besides fixed oil, etc.

Uses.—Same as of strychnine. The drug is very variable in alkaloidal strength, and is, therefore, not a good form for use.

It is sometimes used in the West for poisoning wolves, and is commonly called "ox vomit," which is a corruption of its proper name.

Dose.—0.05 to 0.3 gram (1 to 5 grains), in powder or pill, three times daily.

NUCIS VOMICÆ ABSTRACTUM; U. S.

ABSTRACT OF NUX VOMICA.

Preparation.—See the Pharmacopœia, page 5. Best made from fluid extract of nux vomica, one thousand cubic centimeters (34 fluid-ounces) of which will yield five hundred grams (17 ounces 280 grains) of the finished abstract.

Dose.—Three to fifteen centigrams ($\frac{1}{2}$ to 2 grains).

NUCIS VOMICÆ EXTRACTUM; U. S.

Extract of Nux Vomica.

From five hundred grams (17⅔ avoirdupois ounces) of nux vomica in No. 40 powder. The menstruum to be used is a mixture of alcohol and water in the proportion of two hundred and forty grams (10 fluidounces) alcohol to every thirty grams (1 fluidounce) of water. Moisten with five hundred grams (about 19 fluidounces). Macerate in a closed vessel in a warm place for forty-eight hours. Then pack it in a cylindrical percolator, and percolate with the menstruum described until the percolate that passes through is but slightly bitter. Then distil off the alcohol, and evaporate the remainder to extract. No glycerin is to be added.

The extract is yellowish- or orange-brown. Yield about eight to ten per cent. One gram (15 grains) of extract of nux vomica represents probably about 0.05 grams (or about 1 grain) of strychnine.

The fixed oil which is found in extract of nux vomica, giving it a greasy appearance and feel, cannot be avoided when a strong alcoholic menstruum is used. It should be removed before the evaporation by precipitation with water.

Dose.—0.015 to 0.05 gram (¼ to 1 grain).

NUCIS VOMICÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Nux Vomica.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use alcohol and water mixed in the proportion of eight hundred grams (about 33⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with five hundred cubic centimeters (about 17 fluidounces) of the menstruum. Macerate in a closed vessel and in a warm place for forty-eight hours. Pack it tightly in a cylindrical percolator. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate.* Continue the percolation until the percolate is but slightly bitter.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred

and fifty-five and two-third grains; and each fluidrachm nearly fifty-seven grains.

Dose.—0.05 to 0.03 cubic centimeter (1 to 5 minims).

NUCIS VOMICÆ TINCTURA; U. S.

TINCTURE OF NUX VOMICA.

Mix a sufficient quantity of menstruum consisting of eight parts by weight (about ten parts by measure) of alcohol and one part water. Moisten about one hundred and twenty grams (4 ounces 100 grains) nux vomica, in No. 60 powder, with one hundred and fifty cubic centimeters (5 fluidounces) of the menstruum; macerate twenty-four hours; then pack it tightly in a cylindrical percolator, and percolate with the same menstruum until the drug is exhausted. Reserve five hundred and forty grams (about 22 fluidounces) of first percolate. Evaporate the second percolate to sixty grams (about $2\frac{1}{2}$ fluidounces) and mix this with the first percolate.

Now ascertain the quantity of dry extract contained in the tincture by evaporating a weighed portion to dryness. Then add enough menstruum to make the finished product contain two per cent. of dry extract. Filter.

Nux vomica yields about ten per cent. dry extract. Hence this tincture represents about twenty per cent. of its weight of nux vomica. This assay is necessary to render the strength of this preparation uniform, as it has been found to vary greatly according to the quality of the drug, the greater or less fineness of the powder used, and the manner in which the percolation may be conducted.

Dose.—0.3 to 1.3 cubic centimeter (5 to 20 minims).

Œnothera.

ŒNOTHERA.

Œnotheræ Herba—Evening Primrose.

Origin.—*Œnothera biennis*, Linné (*Onagraceæ*).

Habitat.—North America.

Parts used.—The flowering young twigs, the leaves, and the bark

Description.—The stem is from eight to fifteen centimeters (3 to 6 inches) high, hairy, frequently of a purplish color; the leaves are eight to twelve centimeters (3 to 5 inches) long, oblong, acute, hairy; flowers yellow. Plant inodorous; flowers powerfully fragrant. Taste mucilaginous, mildly astringent, afterward acrid.

Constituents.—Mucilage and some acrid substance not yet isolated.

Medicinal Uses.—Slightly astringent and occasionally used in diarrhœa. Best given in the form of FLUID EXTRACT made with diluted alcohol, of which the

Dose is one to two cubic centimeters (15 to 30 minims).

Olea Fixa.

FIXED OILS.

Olea—Olea Pingua.

The fixed oils or fats are the glycerides of fatty acids. They occur generally in seeds, but also in other parts of plants, and in the animal body.

Drying oils are those which evaporate, when exposed to the air, until a dry film remains; *non-drying oils* do not evaporate. Some of the fixed oils are solid at ordinary temperatures, as for instance cacao butter, suet, etc.; others are liquid even at very low temperatures, as oil of almond.

Many substances have been called "oils" which are not oils at all; thus, "oil of vitriol" is sulphuric acid; "coal oil," or petroleum, is a mixture of hydrocarbons; "ethereal oil," which is an artificial chemical product having nothing whatever in common with oils; and the entire numerously represented class of "volatile oils," which differ as widely from the fixed oils as from any other liquids.

Olea Volatilia.

VOLATILE OILS.

Ætherolea, Olea Ætherea, Olea Destillata—Flüchtige Oele, Aetherische Oele, G.; *Essences, Huiles volatiles*, F.; *Aceite volatil*, Sp.; *Flyktiga oljor*, Sw.; *Essential Oils, Distilled Oils.*

The "volatile oils" have so few properties in common with each other that it is difficult to give a general description of them as a class. They are generally soluble in alcohol and ether, and insoluble in water, fragrant, and form resin when oxidized. Volatile oils are found in all parts of plants. They are in no sense oils. (See "Ætherolea.")

Oleata.

OLEATES.

These are compounds of oleic acid with metals or with alkaloids, usually dissolved in an excess of oleic acid. "Oleate of Mercury" is a

solution of mercuric oxide in an excess of oleic acid ; but it may also be a mixture of oleate of mercury with petrolatum or some other base without any excess of oleic acid. Oleates have also been made of lead, zinc, iron, aconitine, atropine, morphine, strychnine, and veratrine. These preparations are most frequently liquid or semi-liquid ; a few are solid.

Oleates are more readily absorbed through the unbroken skin than medicinal agents merely mixed with fats in ointments.

Oleoresinæ.

OLEO-RESINS.

Mixtures of volatile oils with resins, prepared by exhausting certain drugs containing both together, the menstruum used being usually ether, which extracts both. The menstruum or solvent is evaporated off, and the usually semi-liquid extract which remains constitutes the oleo-resin. In the new Pharmacopœia there are six oleo-resins, viz.: of aspidium, capsicum, cubeb, lupulin, pepper, and ginger.

In the preparation of these products it is best, in order to prevent evaporation, to use a special apparatus constructed so as to confine the ether within the percolator and the receiver, between which communication is established by means of a tube so as to equalize the pressure. The apparatus may further have the receiver placed in a hot-water bath, so as to distil off the ether, which is conducted back into the top of the percolator and there condensed so as to again percolate through the drug. By this means the same menstruum will repeatedly pass through the drug until the latter is exhausted, a minimum quantity of menstruum being used.

Olibanum.

OLIBANUM.

Olibanum Gummi-Resina — Weihrauch, G.; *Oliban, Encens*, F.; *Incienso, Incienso de la India*, Sp.; *Olibanum, Virak*, Sw.; *Frankincense, Thus.*

Origin.—*Boswellia Carterii*, Birdwood, and other species of *Boswellia* (*Terebinthaceæ*).

Habitat.—Eastern Africa and Arabia.

Description.—Round or oblong tears of various sizes, but generally averaging fifteen centimeters ($\frac{3}{5}$ inch) in length, covered with a whitish dust formed by the attrition of the pieces, hard, brittle, with waxy fracture, pale reddish yellowish, translucent ; when masticated it

softens and forms a whitish emulsion with the saliva. Odor balsamic; taste bitterish. Soluble to a great extent in alcohol. When heated it bubbles, and ignited it burns with a smoky flame, emitting a fragrant smoke.

Constituents.—From four to seven per cent. *volatile oil*, fifty to seventy-two per cent. resin, and twenty-one to forty-six per cent. gum (mostly resembling arabin, but a portion resembling bassorin); also some bitter substance.

Uses.—Mainly employed in plasters or in fumigating pastilles. Sometimes used as a blennorrhetic in combination with other remedies.

Doses of two to five grams (30 to 75 grains).

Olivæ Oleum; U. S.

Olive Oil.

Olivarum Oleum—*Olivenöl*, G.; *Huile d'Olive*, F.; *Aceite*, *Aceite comun*, *Aceite de Olivas*, Sp.; *Matolja*, *Bomolja*, Sw.; *Sweet Oil*, *Salad Oil.*

Origin.—*Olea Europæa*, Linné (*Oleaceæ*).

Habitat.—Southern Europe; cultivated.

Drug.—The fixed oil obtained from the ripe fruit.

Production and Varieties.—Virgin Oil is obtained by cold expression of the crushed fresh fruit. This is the choicest grade of olive oil; has a pale yellowish, slightly greenish-yellow cast, is almost odorless, and has a bland pure taste and neutral reaction.

A second grade of Salad Oil (*Oleum provinciale*, or *album*) is next obtained from the same lot of fruit by mixing it with hot water and expressing again. This oil is of a somewhat darker color, a more decided odor, and less pure taste. It is, however, of a good quality.

Finally, a third grade of oil is gotten from the residue after fermentation by boiling and the use of very strong pressure. This is dark colored and has a rancid odor.

Properties.—See the Pharmacopœia, page 240. All olive oil has a peculiar, agreeable odor if good and pure. The taste, although at first quite mild and nutty, leaves at last a faint sensation of acridity. The finer the quality of the oil the longer will it keep sweet. Its specific gravity is 0.915 to 0.918 at 15° C. (59° F.). It is only sparingly soluble in alcohol, but readily soluble in ether. At a temperature below 10° C. (50° F.) it is cloudy from depositing solid fat; and below 2° C. (35.6° F.) it congeals to a whitish granular mass.

Tests.—Inferior olive oil congeals at temperatures above 2° C. (35.6° F.). (See also the Pharmacopœia.)

Chemical Composition.—The most important constituent in olive oil is *olein*, which is the fluid portion, and constitutes more than two-thirds of the weight of the oil. The greater the percentage of olein, the better the oil. The solid fat in olive oil is *tripalmitin*.

Adulterations.—Cotton-seed oil and a great number of other oils are used to adulterate olive oil. In fact, pure cotton-seed oil is sold for "sweet oil" very commonly.

Uses.—Mainly as an article of diet. Medicinally it is employed as a demulcent, and in large doses as a slight laxative.

It is often used as an antidote in *poisoning* by various substances, such as corrosive poisons, etc., and acts mechanically by preventing absorption and protecting the coats of the stomach.

It is very often employed externally as an emollient application or as a vehicle for more active remedies. Anointing with this oil in *scaly* and also in other *skin diseases* is often of much benefit; also in the *cachexia* accompanying inanition in children, when the skin is harsh and dry, or in *fevers* with a hot and dry skin.

Dose.—As a laxative, twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms); less for infants.

OLEOSUS LINCTUS.

White Emulsion.

Triturate ten grams (154 grains) gum arabic in fine powder with forty-five grams (1½ ounce) olive oil until thoroughly mixed; then add gradually, during constant and strong trituration, thirty cubic centimeters (1 fluidounce) orange-flower water and thirty cubic centimeters (1 fluidounce) syrup.

Used either alone or in combination with opiates in *intestinal irritation*, *dysentery*, *tenesmus*, etc.

Dose.—Tablespoonful or more.

OLEOSUS LINCTUS ACIDUS.

Acid White Emulsion.

Prepared in the same manner as the Oleosus Linctus described in the preceding article, except that syrup of citric acid and distilled water are used instead of simple syrup and orange-flower water.

Opium; U. S.

OPIUM.

Meconium, Succus Thebaicus—Opium, G., F., Sw.; *Opio*, Sp.

Origin.—*Papaver somniferum*, Linné (*Papaveraceæ*).

Habitat.—Asia Minor.

Description.—A concrete extract-like substance formed by drying the milky exudation obtained through incisions made in the unripe capsules of the plant. See the Pharmacopœia, page 245.

The whole opium ("lump opium," "gum opium") contains about twenty per cent. of moisture, losing one-fifth of its entire weight by drying. The Pharmacopœia prescribes that normal moist opium shall contain not less than nine per cent. morphine; this will give a yield of about eleven per cent. morphine, after drying. This corresponds with the Customs Regulations of the Treasury Department, in accordance with which the Drug Examiners appointed by the Government reject all opium containing less than nine per cent. morphine. The new U. S. Pharmacopœia in other words admits the use of the opium of the lowest grade that is permitted to be entered through our custom-houses. When dried and powdered this opium cannot yield less than eleven per cent. morphine.

The Customs Regulations, by the operation of which all opium containing less than nine per cent. morphine has been excluded from the United States, have been in force for at least ten years. During that time, therefore, no opium could have entered the United States which contained less than eleven per cent. morphine after drying. As the Pharmacopœia of 1870 permitted the use of opium which after drying yielded not less than ten per cent. morphine, the old pharmacopœial standard was ten per cent. below the lowest possible grade of opium that was allowed by the Government to be imported.

The actual morphine strength of the opium used in this country for several years past has probably averaged not less than twelve to sixteen per cent. after drying, and frequently exceeded that strength.

In Flückiger and Hanbury's Pharmacographia, these authors express the belief that any opium containing less than ten per cent. morphine is probably adulterated.

The standard minimum morphine strength of opium, as fixed by the old Pharmacopœia (ten per cent.) was, therefore, considerably below the actual strength of the opium in use, and the standards of the new Pharmacopœia are as nearly correct an approximation to the average grades of opium which have been, and are in use in this country, as can be ar-

rived at. In other words, the pharmacopœial standard has simply been changed to correspond with the actual condition of the opium of the market.

Whole opium is used only for preparing extract of opium, all other preparations of opium being prepared from the dried and powdered opium.

Varieties.—Smyrna, Turkey, or Constantinople opium is the only kind brought to this country.

Constituents.—Besides from fifteen to twenty-eight per cent. (in most cases from twenty to twenty-one per cent.) moisture, opium contains meconic acid, a great number of alkaloids, and many other substances. The most important constituent is *morphine*, of which from two and a half to nearly twenty-three per cent. has been found in different kinds of opium. *Narcotine* has been found to the extent of from 1.3 to nearly eleven per cent. *Codeine*, one-fifth to two-fifths per cent. Papaverine, narceine, thebaine, and cryptopine have also been more or less tried in medicine.

Medicinal Uses.—Opium is a powerful and reliable narcotic, often employed to relieve pain and to produce sleep.

The first effect of a full medicinal dose of this drug is one of stimulation, and opium is often given for the purpose of obtaining this effect in conditions of nervous exhaustion, as in *simple insomnia* from overexertion, in *typhoid* and *typhus fevers*, *delirium*, or *subsultus tendinum*, and many other similar conditions.

This stimulant effect is soon followed by a condition of drowsiness, and sleep ensues, during which there is a more or less complete unconsciousness in regard to pain. The anodyne effect may be produced without giving hypnotic doses. Opium is, therefore, a valuable remedy in all diseases accompanied by pain, as in *neuralgic* or *rheumatic disorders*, *lumbago*, *sciatica*, *painful wounds*, *swellings* or *abscesses*, during the passage of *renal calculi*, *gallstones*, in *after-pains of labor*, or in other painful affections.

Opium also allays nervous and muscular irritation resulting in *cramps* or *spasms*, as in *colic*, *spasmodic asthma*, *uterine colic*, *whooping-cough*, etc.

By suspending the action of the muscular fibres, opium secures rest and affords a chance for recovery in *rupture* of the *intestines*, *uterus*, or *bladder*, preventing the extravasation of the contents of these organs into the peritoneal cavity. It is also our most important remedy in *peritonitis*, often being tolerated in very large doses in this painful and dangerous disease.

Opium is generally employed to check excessive secretion from vari-

ous organs, as in *cholera*, *cholera-morbus*, *diarrhœa*, and *dysentery*, in *diabetis*, *excessive salivation*, etc. It is also very often employed to relieve *coughs* of all kinds, being an ingredient of many cough mixtures. This action of opium is especially valuable in coughs due to irritation, as in *laryngitis*, *phthisis*, etc. Its use is contra-indicated in cases of capillary or chronic bronchitis accompanied by a typhoid tendency, as by its anodyne effects it suppresses the desire to cough and thereby may prevent the expectoration of accumulated mucus, and thus hasten death by interfering with the aëration of the blood.

In *tenesmus* of the sphincters of the anus or bladder opium is also found to be very useful.

Dose.—About 0.06 gram (1 grain) for an adult. The dose for children is comparatively smaller than that of other remedies, as children do not bear opium well. In fact, this remedy should be given with extreme caution, if at all, to children under one year of age.

Poisonous Effects.—In excessive doses opium produces symptoms of narcotic poisoning, total relaxation, coma, and death from paralysis of the respiratory muscles. The sleep becomes so profound that the patient cannot be roused from his lethargy ; the breathing is labored, slow, and stertorous, the face dusky and swollen, the pupils are contracted and the heart's action slow and feeble.

It may occasionally be difficult, if not impossible, to distinguish this condition from apoplectic effusion in the brain, uræmic poisoning, or alcoholic coma, and external circumstances may have to be sought for to confirm the diagnosis, as the finding of a vial with a remnant of laudanum, an empty paper which might probably have contained morphine, letters expressing a determination to commit suicide, etc.

Antidotal Treatment.—The stomach should be promptly evacuated by means of emetics (subcutaneous injection of apomorphine), if early enough ; or by the stomach-pump, if the patient is already comatose.

The patient should be walked about, and the tendency to coma counteracted by alternate cold and warm affusions or douches, by rubbing, external stimulation, flagellation, stimulants, strong coffee, subcutaneous injection of atropine, or, if necessary, artificial respiration and the application of electricity to the heart and respiratory muscles.

Habitual Abuse of Opium.—A tolerance for this drug is easily established, and enormous doses can then be taken. We have seen one drachm of morphine swallowed at a single dose.

The habit of opium-eating, once acquired, is very difficult if not impossible to abandon again, and the victim generally succumbs to the evil effects of the drug, a mental and physical wreck.

The cure of opium-eating may be attempted by gradually reducing the quantity taken and substituting aromatics, spices, bitters, etc., but the attempt will probably be a failure unless the patient is placed in an asylum where he is under complete control.

OPII ACETUM; U. S.

Vinegar of Opium.

Macerate thirty grams (1 ounce 256 grains) powdered opium, and nine grams (140 grains) ground nutmeg with one hundred and fifty cubic centimeters (5 fluidounces) diluted acetic acid for twenty-four hours. Transfer the mixture to a conical glass percolator and let the liquid percolate, returning it repeatedly, until it runs through clear. Then continue the percolation with diluted acetic acid until two hundred and forty cubic centimeters (8 fluidounces) percolate has been received. In this dissolve sixty grams (about 2 ounces) sugar without the aid of heat. Strain.

Represents ten per cent. by weight of powdered opium. It is about thirty-five per cent. weaker than the corresponding preparation of the Pharmacopœia of 1870, which represented 16.3 per cent. opium. The new preparation may therefore be given in fifty per cent. larger doses; but the new preparation should not be prescribed in the increased dose unless it is certain that the new preparation (U. S. Pharmacopœia, 1880) will be dispensed.

Dose.—0.30 to 0.65 cubic centimeter (5 to 10 minims).

OPII ACETUM CROCATUM.

Vinegar of Opium with Saffron.

Black Drops.

Macerate forty-five grams (1 ounce 257 grains) powdered opium, nine grams (139 grains) ground nutmeg, and three grams (46 grains) Spanish saffron, in coarse powder, with one hundred and fifty cubic centimeters (5 fluidounces) diluted acetic acid for twenty-four hours. Transfer the whole to a percolator. Return the percolate repeatedly until it passes clear. Then continue the percolation with diluted acetic acid until two hundred and forty cubic centimeters (8 fluidounces) percolate has been received. In this dissolve sixty grams (about 2 ounces) sugar, and strain.

This is about fifty per cent. stronger than Opii Acetum, 1880.

Dose.—0.20 to 0.40 cubic centimeter (3 to 6 minims).

OPII CONFECTIO; PHAR. 1870.

CONFECTION OF OPIUM.

Mix thoroughly one gram (15 grains) powdered opium, twelve grams (185 grains) aromatic powder, and twenty-eight grams (432 grains) honey.

This is twenty per cent. stronger than the corresponding preparation of the British Pharmacopœia and that of the French Codex; it is two and one half times the strength of that of the German Pharmacopœia.

Dose.—2.50 grams (40 grains) equal to 0.06 gram (1 grain) of powdered opium.

OPII EMPLASTRUM; U. S.

OPIUM PLASTER.

Emplastrum Anodynum.

Triturate forty-five grams (694 grains) extract of opium with sixty grams (2 ounces) water until a soft uniform mixture is obtained; then add a melted mixture of one hundred and thirty-five grams (4½ ounces) Burgundy pitch and five hundred and seventy grams (19 ounces) lead plaster, and stir well together, continuing the heat (on water-bath) and the stirring until the moisture has evaporated. Nearly identical with the preparation of 1870.

Employed to relieve local pains of a neuralgic or rheumatic character.

OPII ENEMA; B.

ENEMA OF OPIUM.

Add two cubic centimeters (½ fluidrachm) of tincture of opium to sixty cubic centimeters (2 fluidounces) of mucilage of starch, for one enema.

Useful in *painful tenesmus* in some cases of *dysentery* or *hemorrhoids.* As a rule the dose of narcotics given in enema should not greatly exceed the dose given by the mouth, as they often exert the same effect whichever way they are given.

OPII ET CAMPHORÆ PILULÆ.

PILLS OF OPIUM AND CAMPHOR.

Make a pill mass of five grams (77 grains) powdered opium, ten grams (154 grains) camphor, sufficient powdered tragacanth, and a little glycerin; divide this into one hundred pills.

Each pill contains five centigrams ($\frac{3}{4}$ grain) opium, and ten centigrams ($1\frac{1}{2}$ grain) camphor.

Dose.—One pill, repeated when necessary.

OPII ET GLYCYRRHIZÆ TROCHISCI; U. S.

Troches of Glycyrrhiza and Opium.

(The opium being the most important constituent in this preparation it should be called Opii et Glycyrrhizæ Trochisci, instead of "Trochisci Glycyrrhizæ et Opii.")

Mix thoroughly thirteen grams (200 grains) powdered extract of glycyrrhiza, 0.32 gram (5 grains) powdered extract of opium, thirteen grams (200 grains) powdered acacia, and 19.50 grams (300 grains) powdered sugar. Then incorporate 0.20 gram (3 grains) volatile oil of anise. Finally, form a proper mass with a sufficient quantity of water, and divide it into one hundred troches. Each troche contains 0.003 gram ($\frac{1}{20}$ grain) of extract of opium.

N. B.—The extract of opium prepared as directed in the new Pharmacopœia (1880) cannot be powdered as it contains five per cent. glycerin. The direction to use "Extract of Opium, in fine powder," for making the above troches, and the note under Extractum Opii to the effect that it enters into these troches, are inconsistent with the process for making the extract. Dry and powdered extract of opium can be made by the official process if the glycerin is omitted, which would improve the preparation in our opinion.

Dose.—One troche several times a day, in *colds*, etc.

OPII ET GLYCYRRHIZÆ VINUM.

Wine of Liquorice with Opium.

Vinum Liquiritiæ Thebaicum—Rosén's Bröst-Droppar.

Macerate for five days twenty grams (308 grains) powdered opium, twenty grams coarsely powdered Spanish saffron, and twenty grams powdered extract of liquorice with one thousand cubic centimeters (34 fluidounces) Malaga wine. Strain. Filter, adding enough Malaga through the filter to make the total filtrate measure one thousand cubic centimeters (34 fluidounces).

This preparation is exceedingly popular and extensively used in Sweden, both alone and as an ingredient in cough-mixtures. Three cubic centimeters (45 minims) of this preparation contain about 0.06 gram (1 grain) of opium.

OPII ET IPECACUANHÆ MISTURA COMPOSITA.

THIELEMAN'S CHOLERA DROPS.

Mix thirty grams (1 ounce) oil of peppermint, two hundred and forty cubic centimeters (8 fluidounces) alcohol, ninety cubic centimeters (3 fluidounces) tincture of opium and saffron, two hundred and forty grams (8 fluidounces) tincture of ipecac, and four hundred cubic centimeters (13½ fluidounces) tincture of valerian.

Very generally used in Sweden as a cholera mixture.

Dose.—About four to eight cubic centimeters (1 to 2 fluidrachms).

RUSSIAN CHOLERA DROPS

Are a preparation similar to the above, made by mixing five cubic centimeters (75 minims) oil of peppermint, twenty cubic centimeters (5 fluidrachms) tincture of opium, sixty cubic centimeters (2 fluidounces) wine of ipecac, and one hundred and twenty cubic centimeters (4 fluidounces) of ethereal tincture of valerian.

Dose.—1 to 1.5 cubic centimeter (15 to 20 minims) every hour or two.

OPII ET IPECACUANHÆ PULVIS; U. S.

POWDER OF IPECAC AND OPIUM.

Pulvis Ipecacuanhæ Compositus, Phar. 1870; *Dover's Powder.*

(Opium being the most important ingredient it should be placed before the ipecacuanha in the title.)

Mix ten grams (154 grains) powdered ipecac, ten grams (154 grains) powdered opium, and eighty grams (2 ounces 360 grains) sugar of milk, in No. 30 powder. Triturate together until reduced to a *very fine* powder.

This preparation is of the same strength as that of the old Pharmacopœia, the powdered opium which has been used in medicine for the past ten or twenty years having been fully as strong in morphine as that now prescribed by the new Pharmacopœia.

The sugar of milk is harder than potassium sulphate, and less disagreeable to the taste. Hence the substitution of sugar of milk in place of potassium sulphate is a double improvement.

This preparation might still be further improved by the use of denarcotized opium instead of powdered opium. The denarcotized opium used for this purpose, however, ought to be one containing twelve and one-half per cent. morphine, so that the resulting Dover's powder may contain eight milligrams (⅛ grain) morphine in every ten grains.

This remedy is a valuable anodyne, hypnotic, and diaphoretic. It may occasionally be employed when the use of opium alone is counter-indicated by a full pulse and dry skin.

Dose.—0.6 gram (10 grains), equal to 0.06 gram (1 grain) of opium, and an equal amount of ipecac.

OPII ET IPECACUANHÆ PULVIS DENARCOTISATUS.

Improved Dover's Powder.

Mix ten grams (154 grains) powdered ipecac, ten grams (154 grains) denarcotized opium, containing exactly twelve and one-half per cent. morphine and eighty grams (2 ounces 360 grains) sugar of milk in No. 30 powder. Triturate the whole forcibly until reduced to a *very fine* powder.

This Dover's powder is free from narcotine, and from the nauseous odorous principle contained in ordinary powdered opium; it is also better divided than the Dover's powder of the old Pharmacopœia (made with sulphate of potassium), and less disagreeable to the taste. Finally the morphine strength—eight milligrams ($\frac{1}{8}$ grain) to each ten grains—is the most suitable. In odor and taste it is decidedly less disagreeable than any other.

Dose.—0.6 gram (10 grains).

OPII ET IPECACUANHÆ SYRUPUS.

Syrup of Ipecac and Opium.

Mix sixty cubic centimeters (2 fluidounces) deodorized tincture of opium, six cubic centimeters ($1\frac{1}{2}$ fluidrachm) fluid extract of ipecac, and enough syrup of orange to make the whole mixture measure four hundred and fifty cubic centimeters (15 fluidounces).

Each teaspoonful (5 cubic centimeters) represents 0.6 gram (10 grains) of Dover's powder made with denarcotized opium.

OPII ET IPECACUANHÆ TINCTURA; U. S.

Tincture of Ipecac and Opium.

(Should be called Tincture of Opium and Ipecac.)

Put one hundred grams (3 ounces 230 grains, or $3\frac{1}{3}$ fluidounces) deodorized tincture of opium in a porcelain evaporating dish, and evaporate it until eighty-five grams (3 ounces, or 3 fluidounces) remain. When it has become cold add to it ten grams (154 grains, or 160 minims) fluid extract of ipecac, filter the mixture, and then add enough diluted alcohol

through the filter to make the total product weigh one hundred grams (3 ounces 230 grains, or measure $3\frac{1}{3}$ fluidounces).

Contains ten per cent. by weight of opium.

Dose.—About ten drops, equal to about 0.06 gram (1 grain) of opium and an equal quantity of ipecac.

OPII ET SASSAFRAS MISTURA.

Godfrey's Cordial.

Dissolve four grams (60 grains) carbonate of potassium in four hundred and fifty cubic centimeters (15 fluidounces) water; add three hundred cubic centimeters (10 fluidounces) molasses, and heat to simmering; remove the scum; when cold add one gram (20 drops) oil of sassafras dissolved in sixty cubic centimeters (2 fluidounces) alcohol, and thirty cubic centimeters (1 fluidounce) tincture of opium.

Thirty cubic centimeters (1 fluidounce) contain about 0.09 gram ($1\frac{1}{2}$ grain) of opium.

Dose.—For adults, four to fifteen cubic centimeters (1 to 4 fluidrachms).

OPII EXTRACTUM; U. S.

Extract of Opium.

Cut two hundred grams (7 ounces 24 grains) opium into small pieces, and macerate it twenty-four hours with three hundred grams (10 fluidounces) of water, reducing the drug to a soft pulp by trituration. Press out the liquid. Macerate the residue and express again, repeating the operation four times more, and using each time a new portion of three hundred grams of water, so that one thousand five hundred grams (about 50 fluidounces) of water in all will have been used. Mix the liquids, filter, and evaporate on water-bath to solid extract. Then, while the extract is still warm, incorporate with it one-twentieth of its weight of glycerin.

Reddish-brown. Yield about forty-five per cent.

Thus six centigrams (nearly 1 grain) of *dry* opium (or about one-fourth more of ordinary moist or "gum" opium) corresponds to three centigrams (nearly $\frac{1}{2}$ grain) of extract of opium, and the dose of the extract is, therefore, about one-half of that of powdered opium.

In order to be of standard strength the extract of opium should yield at least twenty per cent. of morphine. If it yield less it was made of opium containing less than nine per cent. of morphine.

This extract of opium is a permanently soft extract and cannot be evaporated to dryness so as to be powdered. If, therefore, "Extract of Opium in fine powder" is to be used as directed by the Pharmacopœia for making troches of ipecac and opium, an extract of opium without glycerin must be used. The official extract of opium not in powder will probably answer the purpose, however, quite as well for troches.

The glycerin in extract of opium is superfluous. It would have been better to evaporate the extract to dryness and powder it, for although the powdered extract of opium usually cakes together more or less when kept, it is very readily broken down to fine powder again at any time when wanted for use by simply triturating it lightly in a mortar.

Dose.—About 0.03 gram ($\frac{1}{2}$ grain).

OPII EXTRACTUM DENARCOTISATUM.

Denarcotized Extract of Opium.

Made in the same manner as extract of opium, but from denarcotized opium instead of the crude opium.

Dose.—About 0.02 gram ($\frac{1}{3}$ grain).

OPII EXTRACTUM LIQUIDUM; B.

Liquid Extract of Opium.

Triturate thirty grams (1 ounce 25 grains) extract of opium with four hundred and eighty cubic centimeters (16 fluidounces) water, gradually added; let stand an hour, stirring frequently; then filter, and finally add one hundred and twenty cubic centimeters (4 fluidounces) alcohol. The whole product should measure six hundred cubic centimeters (20 fluidounces).

Dose.—About 0.65 cubic centimeter (10 minims), said not to derange the nervous system as much as tincture of opium.

OPII LINCTUS TOLUTANUS.

Balsam of Honey.

Macerate together in a warm place, for five days, four grams (62 grains) benzoic acid, five grams (77 grains) powdered opium, twenty grams (308 grains) balsam of tolu, one hundred and twenty grams (4 ounces 100 grains) honey, three grams (46 grains) cochineal, in pow-

der, and nine hundred and forty cubic centimeters (32 fluidounces) brandy. Filter.

Thirty cubic centimeters (1 fluidounce) contain about 0.15 gram (2⅓ grains) of opium.

Used in *coughs*, etc.

Dose.—About four to twelve cubic centimeters (1 to 3 fluidrachms).

OPII LIQUOR COMPOSITUS.

Compound Liquor of Opium.

Macerate one hundred grams (3 ounces 330 grains) powdered opium for twenty-four hours with one hundred and fifty cubic centimeters (5 fluidounces) hot water, and express the liquid. Repeat the maceration four times more, using the same quantity of water each time. Mix the liquids and filter the mixture. Evaporate it on a water-bath until one hundred grams (3 ounces 230 grains) remain. Shake this with two hundred grams (7 ounces 24 grains, measuring about 9 fluidounces) ether several times, and then let the mixture stand until the ether has thoroughly separated. Decant the ether, and evaporate the remainder of the liquid until all odor of ether has disappeared. Then add to it ninety cubic centimeters (3 fluidounces) water. Filter. Add one hundred and twenty cubic centimeters (4 fluidounces) alcohol, and one hundred and twenty cubic centimeters (4 fluidounces) water. Assay the resulting solution, and having ascertained the percentage of morphine it contains, dilute it with water so that each fifteen cubic centimeters (½ fluidounce) shall contain 0.25 gram (4 grains) morphine. Then add to every fifteen cubic centimeters of the liquid, one cubic centimeter (16 minims) chloroform, two cubic centimeters (32 minims) acetic ether, and thirteen cubic centimeters (3½ fluidrachms) stronger alcohol.

Dose.—About one cubic centimeter (15 minims).

OPII LIQUOR SEDATIVUS.

Battley's Sedative Drops.

Dissolve one hundred grams (3 ounces 230 grains) extract of opium in one thousand cubic centimeters (34 fluidounces) boiling water; filter the solution; then add two hundred and forty cubic centimeters (8 fluidounces) alcohol.

Each twelve minims contains about one grain extract of opium, representing over two grains powdered opium. It is nearly twice the strength of the tincture of opium.

Dose.—About four or five drops.

OPII MISTURA COMPOSITA.

COMPOUND OPIUM MIXTURE.

Diarrhœa Mixture.

Mix seventy-five cubic centimeters (2½ fluidounces) chloroform, two hundred cubic centimeters (6¾ fluidounces) tincture of opium, two hundred cubic centimeters spirit of camphor, two hundred cubic centimeters tincture of capsicum, and three hundred and twenty-five cubic centimeters (11 fluidounces) alcohol.

Dose.—About 2.5 cubic centimeters (half a teaspoonful) in water.

OPII PILULÆ; U. S.

PILLS OF OPIUM.

Mix 6.50 grams (100 grains) powdered opium and 1.62 gram (25 grains) powdered castile soap, and form a pill mass, with sufficient water. Divide this into one hundred pills.

Each pill contains one grain opium.

OPII PULVIS; U. S.

POWDERED OPIUM.

"Opium dried at a temperature not exceeding 85° C. (185° F.) and reduced to No. 50 powder."

Required to yield by the official method of assay not less than twelve nor more than sixteen per cent. morphine.

Any powdered opium containing less than twelve per cent. morphine must be strengthened by mixing it with a stronger opium, and any opium containing more than sixteen per cent. morphine must be reduced by mixing it with opium of a lower morphine strength in the proportions necessary to bring the resulting product within the prescribed limits.

As the Government permits the importation of opium containing less than twelve or more than sixteen per cent. morphine, the necessity of assaying the opium before using it is obvious.

Dose.—About 0.06 gram (1 grain).

OPII TINCTURA; U. S.

TINCTURE OF OPIUM.

Laudanum.

Triturate thirty grams (1 ounce 25 grains) powdered opium with one hundred and twenty cubic centimeters (4 fluidounces) hot water (90° C.,

or 194° F.) until reduced to a smooth paste; macerate twelve hours; then add one hundred and twenty cubic centimeters (4 fluidounces) alcohol, mix well, and transfer the whole to a conical percolator. Percolate, returning the liquid that passes until it comes through clear. When the percolate ceases to drop, gradually add diluted alcohol, and thus continue the percolation until three hundred grams (10 ounces 250 grains, measuring about $10\frac{2}{3}$ fluidounces) tincture has been obtained.

One fluidounce of the tincture of opium of the Pharmacopœia of 1870 weighed about four hundred and thirty grains, and contained the activity of thirty-seven and one-half grains of opium. The gravimetric strength of that preparation was therefore about 8.72 per cent. That of the tincture of opium of the new Pharmacopœia is ten per cent. Hence the new laudanum is rather more than fourteen and two-thirds per cent. stronger than the old *by weight*, and if the dose of the old be considered as ten grains, then the dose of the new should be eight and three-fourths grains.

One fluidounce of the new tincture of opium represents about 43.225 grains opium, and is about fifteen and one-fourth per cent. stronger *volumetrically* than that of the Pharmacopœia of 1870. Hence if the dose of the old laudanum was thirteen minims that of the new is about eleven minims.

The above comparisons are as nearly correct as possible, the specific gravity of the respective diluted alcohols of the two Pharmacopœias being considered as well as the proportion of opium dissolved.

The morphine strength of the opium which has been actually used for twenty years past in this country having been as nearly as possible the same as now prescribed by the new Pharmacopœia, there is no other difference between the two laudanums than that occasioned by the different proportions in the new formula, which is as already stated.

Tincture of opium prepared according to the *Pharmacopœia of* 1870, if made from opium containing only nine per cent. morphine, would contain 3.37 grains morphine to each fluidounce; if from opium of ten per cent. morphine it would contain three and three-fourths grains morphine to each fluidounce; if from opium of ten and three-fourths per cent. morphine it would contain four grains morphine to the fluidounce; if from opium of twelve per cent. morphine it would contain four and one-half grains morphine to the fluidounce; if from opium of twelve and one-half per cent. morphine it would contain four and two-thirds grains morphine in each fluidounce; if from opium of thirteen and one-half per cent. morphine strength it would contain five grains of the alkaloid in each fluidounce; and if from opium of sixteen per cent.

morphine strength it would contain six grains morphine in each fluidounce.

When made according to the *new Pharmacopœia* (1880), using an opium of thirteen and one-half per cent. morphine strength, the tincture will contain six grains morphine in each fluidounce.

Dose.—About 0.6 cubic centimeter (10 minims), equal to 0.06 gram (1 grain) of opium.

OPII TINCTURA CAMPHORATA; U. S.

Camphorated Tincture of Opium.

Paregoric Elixir, Paregoric, Compound Tincture of Opium.

Macerate together for seven days four grams (60 grains) powdered opium, four grams benzoic acid, four grams camphor, four grams volatile oil of anise, forty grams (1 fluidounce) glycerin, and nine hundred grams (31 ounces 330 grains, measuring about 32¾ fluidounces) diluted alcohol. Filter through paper, in a well-covered funnel, and afterward pass enough diluted alcohol through the filter to make the whole product weigh one thousand grams (35 ounces 120 grains, measuring about 36 fluidounces).

The glycerin takes the place of the honey formerly used. It might well have been omitted in order to further improve the preparation. The alcoholic strength of this tincture is now sufficient to keep it clear.

0.06 gram (1 grain) of opium is contained in about seventeen cubic centimeters (or 275 minims) of this tincture.

Dose.—About fifteen cubic centimeters (½ fluidounce).

OPII TINCTURA CROCATA.

Tincture of Opium and Saffron.

Vinum Opii Crocatum—Sydenham's Laudanum.

Macerate together for five days six grams (92 grains) coarsely powdered cinnamon, six grams ground cloves, thirty-five grams (1 ounce 100 grains) Spanish saffron, one hundred grams (3 ounces 230 grains) powdered opium, and sufficient Malaga wine to make the total final product measure one thousand cubic centimeters (34 fluidounces).

Dose.—About 0.06 cubic centimeter (10 minims) equal to 0.008 gram (⅛ grain) of morphine.

OPII TINCTURA DEODORATA; U. S.

Deodorized Tincture of Opium.

Triturate ten grams (154 grains) powdered opium with forty grams ($1\frac{1}{3}$ fluidounce) water, gradually added, until reduced to a smooth paste, and macerate for twelve hours; express the liquid; repeat this maceration twice, using each time the same quantity of water. Mix the liquids and evaporate the mixture to ten grams (154 grains), and shake this repeatedly with twenty grams (308 grains or 410 minims) ether in a bottle. Let stand until the ether separates and then pour it off. Evaporate the remaining liquid until all odor of ether has disappeared. Mix the residue with fifty grams ($1\frac{2}{3}$ fluidounce) water, and filter through paper. When the liquid has passed add enough water through the filter to make the whole weigh eighty grams (2 ounces 360 grains). Then add twenty grams (308 grains or $6\frac{2}{3}$ fluidrachms) alcohol.

This preparation is much lighter in color than the tincture of opium, as the ether removes not only the narcotine and the odorous matter but also much coloring matter.

Deodorized tincture of opium is sold in this country very frequently under the name of "Fluid Extract of Opium, Deodorized," or "Fluid Extract of Opium, Aqueous."

McMunn's Elixir of Opium is also a deodorized tincture of opium of about the same strength as the official preparation, which ought to be used in preference to it. The deodorized tincture is less nauseating than the simple tincture of opium, and less liable to produce the disagreeable effects often following the use of the latter.

Dose.—About 0.6 cubic centimeter (10 minims) equal to about 0.06 gram (1 grain) of opium.

OPII TINCTURA PECTORALIS.

Bateman's Drops.

Macerate together for ten days five grams (77 grains) powdered opium, five grams powdered catechu, five grams camphor, one gram (15 grains) volatile oil of anise, and one thousand cubic centimeters (34 fluidounces) diluted alcohol. Express, filter, and add caramel to give the product a dark sherry color. About one-fourth stronger than paregoric.

Dose.—Eight to twelve cubic centimeters (2 to 3 fluidrachms).

OPII VINUM; U. S.

Wine of Opium.

Macerate together for seven days ten grams (154 grains) powdered opium, one gram (15 grains) cinnamon in fine powder, one gram ground

cloves, and one hundred grams (3⅓ fluidounces) stronger white wine, shaking occasionally. Filter. Add enough stronger white wine through the filter to make the total product weigh one hundred grams (3 ounces 230 grains, measuring about 3½ fluidounces).

Dose.—About 0.6 cubic centimeter (10 minims) equal to about 0.06 gram (1 grain) of opium.

OPIUM DENARCOTISATUM; U. S.

Denarcotized Opium.

Macerate five hundred grams (17 ounces 280 grains) powdered assayed opium containing fourteen per cent. morphine for twenty-four hours with two thousand five hundred grams (or about 7 pints) stronger ether, in a well-closed flask or tin can, shaking the mixture well from time to time. Then let it rest until it settles; pour off the clear ethereal liquid and set it aside. Add a fresh portion of one thousand two hundred and fifty grams (about 3½ pints) stronger ether to the remainder, and macerate twelve hours, shaking occasionally as before. Let settle again, and pour off the clear. Finally add a third portion of one thousand two hundred and fifty grams stronger ether, macerate for two hours, and after allowing the powder to subside, pour off the ether.

Mix the three portions of ether that were used, and rectify the mixture by distillation in a water bath, the distillate to be set aside for future use for the same purpose.

Collect the now denarcotized opium in a weighed dish and dry it. Gentle heat may be applied at first, but toward the latter part of the drying the temperature should not exceed 85° C. (185° F.). Then add enough milk sugar to make the whole product weigh five hundred grams (17 ounces 280 grains), and triturate thoroughly until reduced to a uniform mixture in fine powder.

If the opium to be denarcotized contains more than fourteen per cent. morphine the quantity of milk sugar added must be proportionately increased.

The ether extracts from the opium its *narcotine*, together with the nauseous odorous principle contained in the drug, and also a large proportion of the coloring matter.

Dose.—The same as of the ordinary powdered opium.

Denarcotized opium is free from the sickening effects sometimes produced by the common powdered opium.

Origanum; U. S.

ORIGANUM.

Origani Herba—Dosten, Wilder Marjoran, Meiran, G.; *Origan, Marjolaine sauvage*, F.; *Bergmynta*, Sw.; *Wild Marjoram.*

Origin.—*Thymus vulgare*, Linné (*Labiatæ*).

Habitat.—Asia, Africa, Europe, and North America.

Part used.—The herb.

Description.—The leaves are translucently dotted by oil glands, dark green on the upper side, pale green and hairy on the under side; flowers pale purple.

Constituents.—About one to two per cent. volatile oil; also some tannin, bitter principle, and resin.

Properties.—Stimulant, carminative, emmenagogue. Rarely, if ever, used internally. Sometimes used externally in fomentation.

Dose.—Five to ten grams (1 to $2\frac{1}{2}$ drachms) in infusion.

Oryzæ Semina.

RICE.

Origin.—*Oryza sativa*, Linné (*Graminaceæ*).

Habitat.—The famous rice plantations of the Carolinas and other of our Southern States furnish the best rice in the world.

Part used.—The seeds, with the hulls removed.

Description.—The appearance of this common article of food is familiar. The rice should be large, pure white, clean, and contain but few broken grains.

Constituents.—About eighty-five to ninety per cent. starch, seven per cent. nitrogenous matters, and less than one per cent. fat. It thus contains more starch and less fat than any other cereal.

Uses.—Nutrient.

Rice-Water is extensively employed as a demulcent and refrigerant drink. It is made by boiling thirty grams (1 ounce) rice with one thousand cubic centimeters (34 fluidounces) water for an hour or two. The decoction is to be used cold and without straining it.

ORYZÆ FARINA.

RICE FLOUR.

A flour made from the fruit of *Oryza sativa*, Linné.

Must be an impalpable powder. Perfectly white.

Used as a soothing application to the skin, and as an ingredient in cosmetic powders.

Oryzæ Amylum.

RICE STARCH.

Prepared from the fruit of *Oryza sativa*, Linné.

Perfectly white, and in irregular masses. Large quantities are consumed in the form of patent laundry starch.

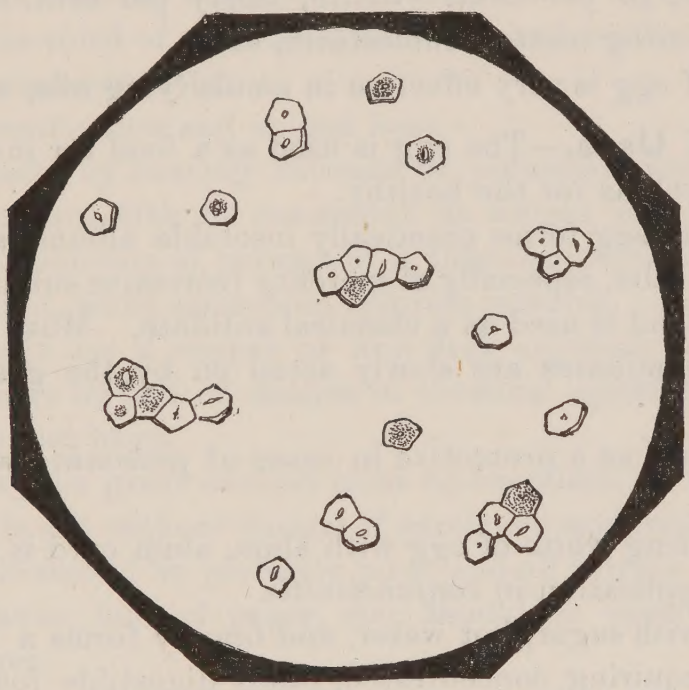


FIG. 389.—Rice Starch, magnified.

Its granules are angular, rather uniform in size, and the smallest of those of any of the commercial starches.

Uses.—Same as of rice flour.

Ossa Sepiæ.

CUTTLEFISH BONE.

Origin.—*Sepia officinalis*, Linné (*Cephalopoda*).

White, oval scales, about ten centimeters (4 inches) long, made up of a hard shell filled with a friable, porous mass. Has a perceptible marine odor, and a somewhat salty taste.

Constituents.—Animal matter, calcium carbonate sodium chloride, etc. Pharmaceutically it is sometimes used as an ingredient in tooth-powders.

Ovum.

EGG.

The egg is about ten per cent. shell, sixty per cent. albumen, and thirty per cent. yolk. The "white" of one egg (*albumen ovi*) weighs

on the average twenty to twenty-six grams (about 300 to 400 grains), and consists of about eighty-two to eighty-eight per cent. water, and twelve to eighteen per cent. solid matters, chiefly albumen, with traces of fat, sugar, and mineral salts.

The "yolk" of one egg (*vitellus ovi*) weighs about ten to fifteen grams (150 to 230 grains), and is composed of forty-eight to fifty-five per cent. water, 16 per cent. vitellin, thirty per cent. fat, some inorganic salts, coloring matter, cholesterin, etc.

The yolk of egg is very effective in emulsifying oils, wax, etc.

Medicinal Uses.—The egg is used as a food for invalids and convalescents as well as for the healthy.

The white of egg forms practically insoluble albuminates with some of the mineral salts, especially of mercury (corrosive sublimate) and copper (sulphate), and is used as a chemical antidote. Must be followed by emetics, as albuminates are slowly acted on by the gastric juice and dissolved.

It is also used as a protective in cases of *poisoning* with the corrosive poisons.

By coagulating white of egg with alum, alum curd is formed, which is a valuable application in *conjunctivitis.*

The yolk, with sugar, hot water, and brandy forms a nutrient drink for patients requiring concentrated, easily digestible food with stimulants.

Oxycedri Pyroleum.

OIL OF CADE.

Juniperi Oleum Empyreumaticum, Oleum Cadinum — *Kadeöl*, G.; *Huile de Cade*, F.; *Envedstjära*, Sw.

The oil of cade is a tar-like empyreumatic liquid, prepared chiefly in France by destructive distillation of the wood of *Juniperus oxycedrus*, Linné (*Coniferæ*). It is thinner than pine-tar, and has a peculiar empyreumatic odor different from that of ordinary tar and reminding of juniper.

Constituents.—Similar to those of other tar-like products. The oil of cade contains volatile oil of juniper.

Medicinal Uses.—As a parasiticide in *scabies*, etc.; also as an external application in *rheumatism*, and in many skin diseases, as *psoriasis*, etc.

Oxygenium.

OXYGEN.

Oxygen is a colorless and odorless gas, the importance of which is manifest from its abundance and general distribution. It makes up probably more than one-half of the weight of the earth's crust, the animal and vegetable creation included. It constitutes eight-ninths of all water, at least one-third of the rocks, minerals, and earthy matters, and one-fifth of the atmospheric air.

It supports combustion and animal heat.

It is best made by heating chlorate of potassium which has been mixed with about one-fifth to one-fourth its weight of black oxide of manganese. The chlorate of potassium is then decomposed, all its oxygen being liberated, while potassium chloride remains. For generating oxygen it is best to use a copper or iron flask expressly made for this purpose, which may be had of dealers in chemical apparatus. The gas is collected in rubber bags.

In making oxygen great caution must be exercised, as the manufacture of this gas is not without danger if carelessly undertaken.

The chemicals should be perfectly pure, and all foreign organic matter, as, for instance, bits of paper, etc., should be carefully removed from the packages.

The chemicals may be tested by heating an ounce or two of the mixture in an iron ladle over a Bunsen burner until the chlorate is melted, and if the oxygen comes off quietly, without sparks of fire or slight explosions occurring in the mixture, the chemicals are safe, and, if possible, a large stock of that lot, especially of the black oxide of manganese, should be purchased, and kept free from dust or admixture of any kind until wanted for use.

Five hundred grams (about $17\frac{2}{3}$ ounces) of chlorate of potassium with one hundred grams (about $3\frac{1}{2}$ ounces) of black oxide of manganese will fill a $30'' \times 40''$ rubber gas-bag.

We use a safety-retort in which an arrangement is made for the harmless escape of any excessive amounts of oxygen which may be generated, as the lid is not clamped on, but is simply a conical plug which is easily blown out by a pressure of a few pounds, so that no explosion can occur, but at most only the materials may be lost if too great a heat is applied.

The stopcocks and tubes should be of large enough calibre, and we should be sure that there is no obstruction before proceeding to make the gas. Frequently the openings in the stopcocks are very small, while all the tubes may be of sufficient calibre.

The oxygen may be passed through a wash-bottle to cool it before passing into a bag.

The best method of heating is by means of a gas-stove, as the heat can be better regulated than when using any other fire.

If oxygen is to be used for inhalation, the gas should be passed through a wash-bottle containing a solution of caustic potassa or soda, to remove any chlorine compounds which may have formed, and which would prove irritating to the lungs ; but the wash-bottle may be inserted between the gas-bag and the mouthpiece through which the gas is inhaled.

Medicinal Uses.—Oxygen gas is used for inhalation by passing it through a *clean* rubber tube, used only for this purpose, and provided with a proper mouthpiece, with stopcock, like those that are used in the inhalation of laughing-gas.

Oxygen has not had much trial as a curative agent in pulmonary complaints, but there can be no doubt that it might be productive of good in some cases, if added in small quantities to the air used in the apparatuses for inhalations of compressed or rarefied air, which have been so beneficial in *asthma* and other *lung diseases.*

On the other hand, oxygen probably would prove deleterious in some cases by stimulating the morbid process of the disease.

But there are numerous cases in which its administration is highly beneficial, namely, all in which there is an insufficiency of air taken into the lungs, as in *asthma, croup, diphtheria,* and similar troubles. In these cases it affords marked, and often instant relief, though it may not be curative in its action. Care must be taken not to convey contagious diseases, as diphtheria, by using the same mouthpiece without first properly cleaning with carbolic acid solution, etc. *Asphyxia* from any cause—from drowning, from inhalation of carbonic dioxide (carbonic acid gas) in cellars, wells, or vaults, house-gas from leaking gas-pipes or from careless blowing out of gaslight by ignorant people, etc.—is generally promptly relieved, and the patient restored. In such cases it may be necessary to provide the end of the tube with a flexible catheter and pass it through the glottis into the trachea and gently force in the gas, taking care that the oxygen is not forced down the œsophagus by mistake, distending the stomach with oxygen, thereby adding another impediment to an already embarrassed respiration.

The most marked relief we ever witnessed from the inhalation of oxygen was in the case of a little child who had taken a drink of lye by accident. The inhalation of pure oxygen promptly arrested the horrible agony of the little patient, and although death ultimately resulted, the relief afforded was a blessing to the child as well as to its parents and friends.

Oxymellita.

OXYMELS.

Mixtures of honey with acid liquids. Thus oxymel scillæ is a mixture of honey and vinegar of squill. The "Oxymel" of the British Pharmacopœia is a mixture of one hundred and fifty cubic centimeters (5 fluidounces) acetic acid, one hundred and fifty cubic centimeters (5 fluidounces) water, and twelve hundred cubic centimeters (40 fluidounces) honey.

Ozonum.

OZONE.

This is oxygen gas changed in properties by electricity or otherwise in such a way as to energetically oxidize, even at ordinary temperatures, substances which are not affected by the common variety of oxygen. Thus it liberates iodine from iodide of potassium, bleaches vegetable colors, etc. It is on this account a powerful disinfectant, and it is truthfully said that a thunderstorm purifies the air, because the quantity of ozone always present in the air is very perceptibly increased by the lightning (electricity). Ozone generators are accordingly placed in hospitals and dwelling-houses for the purpose of keeping the air pure and sweet.

Palmæ Oleum.

PALM OIL.

Palmoel, Palmbutter, G. ; *Huile de palme*, F. ; *Palmolja*, Sw.

Origin.—*Elais guineensis*, Jacqin, and *Elais melanococca*, Gaertner (*Palmaceæ*).

Habitat.—Western Africa and tropical parts of America.

Production.—By pressure, from the fleshy part of the fruit.

Description.—An orange-yellow fixed oil, of the consistence of butter, or somewhat harder. When fresh it has a bland taste and a pleasant violet-like odor. According to its age, it fuses at from 27° to 37° C. (80° to 99° F.). It is readily soluble in ether, but much less so in alcohol.

Constituents.—Tripalmitin and triolein.

Uses.—Largely used in the manufacture of soaps and pomades.

How Kept.—Palm oil rapidly turns rancid, especially when exposed to light and warmth, and then loses its rich color, becoming bleached. When thus decomposed it sometimes contains as much as eighty per

cent. of free fatty acids, and is unfit for some of its most profitable uses. Hence it must be carefully preserved in tightly closed vessels, in a cool, shady place.

Medicinal Properties.—Medicinally it is a pleasant emollient.

Panax.

PANAX.

Panacis Radix—Ginseng.

Origin.—*Aralia quinquefolia*, Gray (*Araliaceæ*).

Habitat.—North America as far down as Georgia and Tennessee. Getting rare.

Part used.—The root.

Description.—Spindle-shaped, fifty to seventy-five millimeters (2 to 3 inches) long, the upper portion annulate ; usually branched into two or three simple branches, wrinkled lengthwise ; sometimes the lower portion is longer and more tapering than in the figure ; the outside is pale brownish-yellow; breaks with a short fracture; internally mealy and white; the bark is thick and has a large number of resin cells ; odor weak, taste sweetish and aromatic.

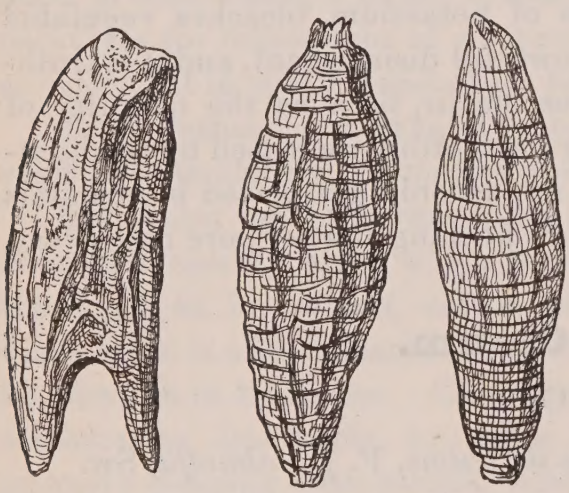


FIG. 390.—Ginseng, natural size.

Constituents.—Resin, and a sweet amorphous substance, which has been called *panaquilon* (S. S. Garrigues).

Medicinal Uses.—Employed as a mild stimulant tonic in *loss of appetite*, etc., in

Doses of two to eight grams (30 to 130 grains). Best administered in the form of FLUID EXTRACT made with diluted alcohol as a menstruum.

Pancreatinum.

PANCREATIN.

Origin.—A proteid contained in the juice of the pancreatic gland and possessing the power of emulsifying and decomposing fat or fixed oil and of converting starch into sugar. The pancreas of the beef is used for its preparation.

Preparation.—Professor E. Scheffer's method of preparing pan-

reatin is as follows : Fresh beef pancreas is finely chopped, macerated or twenty-four hours with water acidulated with a little hydrochloric cid, then macerated a second time with water, the strained and filtered quid treated with calcium carbonate until the acid is neutralized, the quid again filtered, and then mixed with an equal volume of ninety-five er cent. alcohol which precipitates the pancreatin. The precipitate washed with dilute alcohol, pressed between filter paper, and dried ithout the aid of heat.

Properties.—Yellowish, nearly transparent, odorless, soluble in ater, and has an alkaline reaction. Any disagreeable odor present in ancreatin should condemn it.

Tests.—Cod-liver is usually chosen for testing the digestive or mulsifying power of the preparation. Ten grains should emulsify not ss than one hundred and twenty grains.

Uses.—In *atonic dyspepsia*, especially in those cases in which tarch and fat is imperfectly digested.

According to some writers pancreatine is of no medicinal value, as is decomposed and digested in the stomach by the gastric juice, and oes not reach the intestine to take the place of a deficient pancreatic ecretion.

See also "Nutritive Enema," on page 424.

Dose.—0.1 to 0.3 gram (2 to 5 grains).

PANCREATINI EMULSIO.

PANCREATIC EMULSION.

Take two and one-half pounds of fresh pancreas from pigs ; remove ne fat and other extraneous matters ; beat it to a uniform mass in a tone mortar ; add two pounds of lard, and beat the whole well together, dding gradually two and one-half pints water. Strain through muslin.

Add twenty-one pounds ether ; shake thoroughly, and set it aside to eparate. Decant the ethereal solution of pancreatized fat, which floats t the top, from the watery stratum below. Put the ethereal liquid into still and recover the ether by distillation. Pancreatized fat then re- ains. Then mix two pounds pancreatized fat thoroughly with one int alcohol and three pints water. The mixture thus obtained is "pan- reatic emulsion." It has an acid reaction.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Panis Mica.

BREAD CRUMB.

The soft inner portion of well-baked, light, wheat bread.

Sometimes used for poultices or for making pill masses.

Papaveris Fructus.

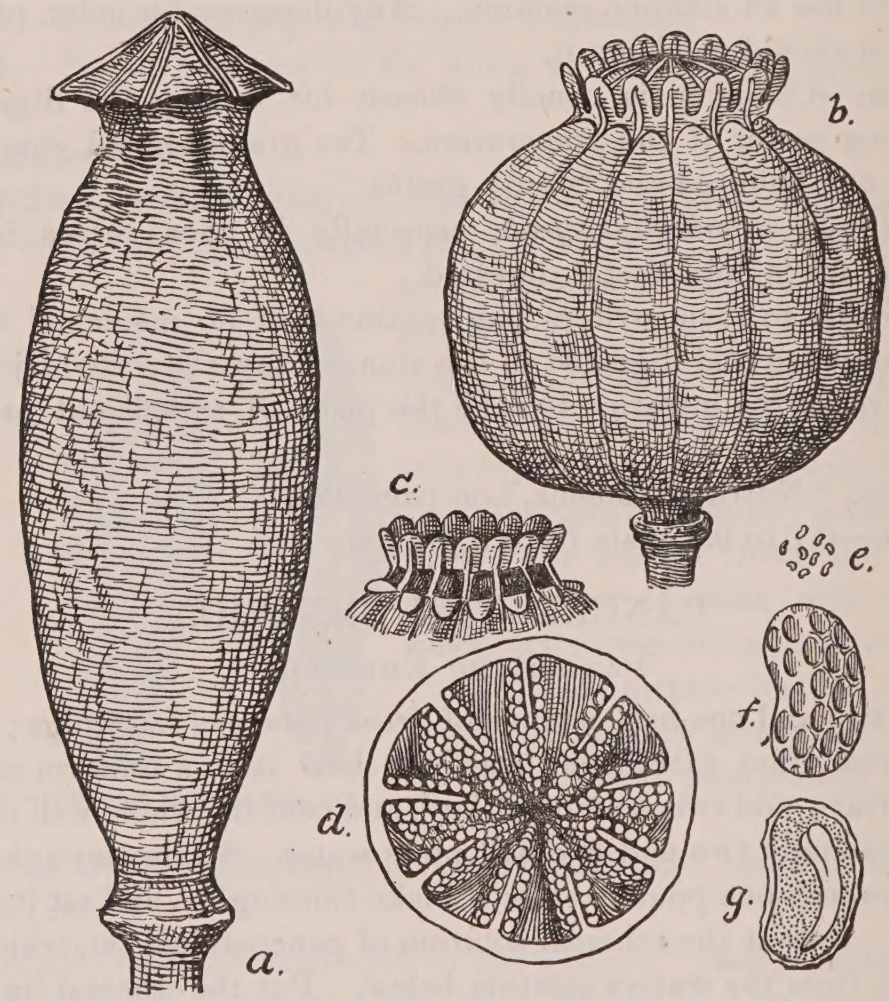
POPPY CAPSULES.

Origin.—*Papaver somniferum*, Linné (*Papaveraceæ*).

Habitat.—Western Asia ; cultivated.

Part used.—The nearly ripe capsules.

Description.—From twenty-five to fifty millimeters (1 to 2 inche long, and about twenty-five millimeters diameter, formed as seen in th



FIGS. 391–397.—Poppy Heads, natural size. *a*, white ; *b*, black ; *c*, dehiscence ; *d*, transverse section ; *e*, seeds, natural size ; *f*, seed, enlarged ; *g*, section of seed.

illustration here presented. Externally pale brownish. Brittle. Con tain numerous small white seeds ("maw seed"). Odor none ; taste somewhat bitter.

Constituents.—Variable and always small quantities of some o the alkaloids of opium, including morphine, narcotine, narceine, rhœadine codeine, and papaverosine.

Medicinal Uses.—Seldom employed, and probably medicinally worthless.

PAPAVERIS DECOCTUM.

DECOCTION OF POPPY HEADS.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug, from which the seeds have been first removed, make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of the British Pharmacopœia.

Used externally as a demulcent and slightly anodyne fomentation.

PAPAVERIS FRUCTUS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF POPPY HEADS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Very slightly anodyne.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms).

PAPAVERIS SYRUPUS.

SYRUP OF POPPIES.

Mix one hundred and twenty cubic centimeters (4 fluidounces) fluid extract of poppy capsules with ninety cubic centimeters (3 fluidounces) water; filter; and dissolve in the filtrate two hundred grams (7 ounces 24 grains) sugar.

Occasionally used in cough-mixtures.

Dose.—About two cubic centimeters ($\frac{1}{2}$ fluidrachm) for small children.

Papaveris Oleum.

OIL OF POPPY SEED.

A clear pale-yellow oil of 0.92 specific gravity, consisting of linolein, palmitin, etc., congealing at −18° C. (0° F.). Odor, slight; taste, mild.

Used as a protective and emollient.

Papaveris Semina.

POPPY SEED.

Maw Seed.

The small white seeds of the poppy. (Figs. 391–397.)

Constituents.—About forty-five per cent. bland fixed oil.

Uses.—As food for man and for birds.

Papaya.

PAPAYA.

Papaw—Mamœiro.

Origin.—*Carica Papaya* (*Passifloreæ*).

Habitat.—South America.

Parts used.—The milky juice of the fruit, and also the leaves.

PAPAW MILK.—A neutral, thick, milky fluid, which coagulates in two parts, one portion being a pulpy mass, which is insoluble or nearly so, the other portion being a colorless, limpid serum. By mixing the milky juice with alcohol (after filtration), a white amorphous powder precipitates, which is entirely and readily soluble in water. When dried this powder forms

PAPAIN.—A peculiar ferment containing 10.6 per cent. nitrogen, perfectly soluble in water, and capable of softening and disintegrating meats, dissolving fibrin, etc. It is, therefore, called a "vegetable pepsin." Unlike pepsin, it dissolves fibrin in a liquid which may be either slightly acid, or neutral, or slightly alkaline; and it acts at higher temperatures than pepsin will bear, and more rapidly.

This ferment has also been called *caricin*.

DRIED PAPAW MILK.—A pale, yellowish-white, coarse powder, which is inodorous. It has been recommended as a purifying application to ill-natured sores and ulcers. It is, in fact, said to digest or dissolve away the diseased portions of the flesh.

Paraffinum.

PARAFFIN.

Solid hydrocarbons, obtained usually from coal oil. White, crystalline, semi-transparent, in small flakes, fatty to the feel; insoluble in water, alkalies, or cold alcohol; soluble in fixed oils, volatile oils, benzin, ether, chloroform, carbon bisulphide, etc.

Pure white paraffin may be either hard or soft, according to its chemical composition.

Soft paraffinoids, such as "cosmolin," "vaselin," "petrolina," etc., are mixtures of several paraffins of a soft consistence (see "Petrolatum").

Paraffini Oleum.

PARAFFIN OIL.

Liquid paraffin. Colorless or pale; nearly odorless. A mixture of hydrocarbons.

Crude paraffin oil is more or less colored, and sometimes very dark.

In commerce, impure liquid paraffins are used under the names "lubricating oil," "neutral oil," "spindle oil," etc.

Used mainly for lubricating.

Pareira; U. S.

PAREIRA.

Pareira Brava.

Origin.—*Chondodendron tomentosum*, Ruiz et Pavon (*Menispermaceæ*).

Habitat.—Brazil and Peru.

Part used.—The root.

Description.—Pieces from a decimeter (4 inches) to a meter (40 inches) or more long, and from twenty-five to seventy-five millimeters (1 to 3 inches) thick, dark grayish-brown or blackish-brown externally, pale brown within. For its general appearance and the peculiar appearance of its section see the illustrations. The root has no distinct central pith. It is inodorous. The taste is bitter.

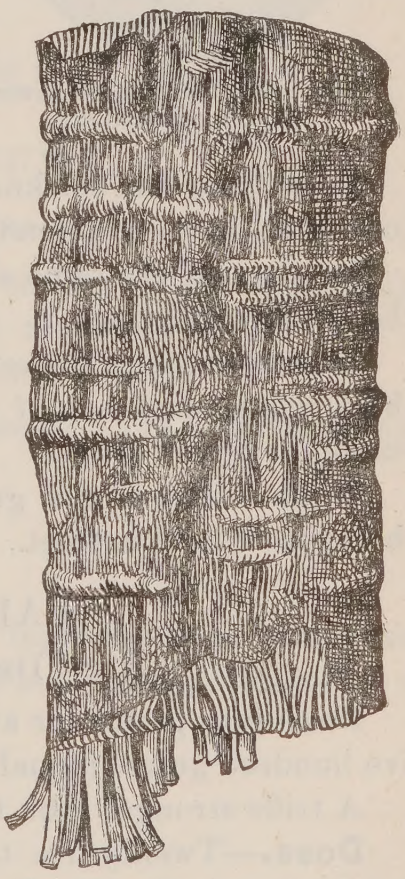


FIG. 398.—Pareira, natural size.

Bright yellow, or grayish, as well as hard and nearly tasteless pieces should be rejected.

Constituents.—About one-half per cent. of an alkaloid called *pelosine*, or *cissampeline*, which is identical with the *beberine* of nectandra, and the *buxine* of common boxwood.

Admixtures.—The stem of chondodendron is often found mixed with the root. It has a thicker bark, is marked by dark-colored warts, and has a central pith. It probably has the same properties as the root.

False Pareiras.—Several spurious drugs have been sold under the name of pareira brava. They all had more or less resemblance to the genuine, but can be at once distinguished from the latter by comparing the appearance of the sections. Any root which does not present the general appearance shown in Figs. 398 and 399 cannot be true pareira brava.

One—the more common—kind of false pareira brava is represented in section by Fig. 400, drawn from a natural specimen.

It is remarkable for its irregular or spurious concentric rings, of

which one can be traced spirally through three turns. The plant it is derived from is unknown.

West Indian Pareira.—This is the root and the stem of *Cissampelos pareira*, Linné, which was formerly supposed to be the source of the pareira brava used in medicine in Europe and America.

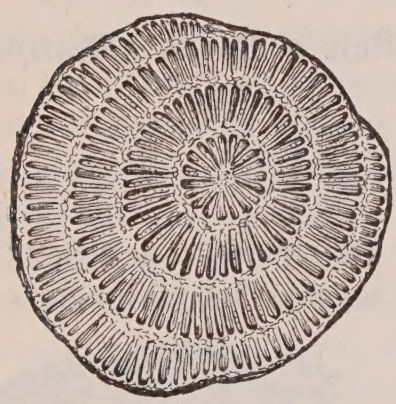


FIG. 399.—Pareira, transverse section, natural size.

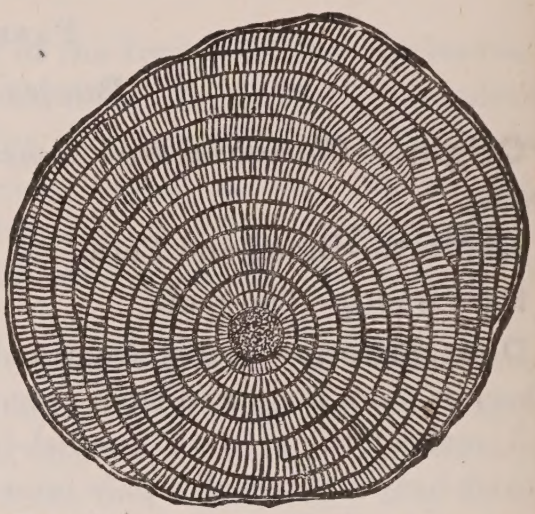


FIG. 400.—False Pareira, transverse section, natural size.

It is from the thickness of a goose-quill to about two centimeters (nearly an inch) in diameter, and is covered by a corky bark.

It contains the same alkaloid as the root of chondodendron and in the same proportion.

Uses.—Pareira is useful in *cystitis* and *pyelitis*, or in all diseases of the mucous membrane of the bladder accompanied by a muco-purulent condition of the urine.

Dose.—Two to five grams (30 to 75 grains). Best administered in the form of fluid extract.

PAREIRÆ DECOCTUM.

DECOCTION OF PAREIRA.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

A trifle stronger than the preparation of the British Pharmacopœia.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

PAREIRÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF PAREIRA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol, two hundred grams (about $6\frac{2}{3}$ fluidounces) water, and one hundred grams (about $3\frac{1}{2}$ avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about $4\frac{1}{6}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Moisten the drug with two hundred grams (about 7 fluidounces) of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters ($14\frac{1}{3}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

PAREIRÆ INFUSUM.

INFUSION OF PAREIRA.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

Pastæ.

PASTES.

Soft solids of a compound nature, the ingredients of which are beaten together into a mass. Almond paste is a typical illustration of a "pasta."

Marsh-mallow drops are made of "pasta."

Pepo.

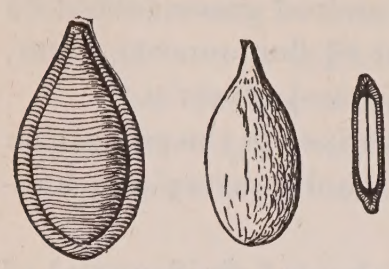
PUMPKIN SEED.

Origin.—*Cucurbita Pepo,* Linné (*Cucurbitaceæ*).

Habitat.—Cultivated.

Part used.—The seeds.

Description.—Flat, oval, about twelve to twenty millimeters ($\frac{1}{2}$ to $\frac{4}{5}$ inch) long, white. Inodorous. Taste oily, bland.



FIGS. 401–403. — Pumpkin Seed, whole, transverse section, and embryo, all natural size.

Constituents.— About forty-four per cent. fixed oil ; protein compounds, starch, resin, sugar, etc.

Properties.—Tænifuge. Best given in emulsion. Or the embryos deprived of the seed coats are beaten into a pulp with sugar.

Dose.—Thirty to sixty grams (1 to 2 ounces) of the fresh seeds. To be followed in a few hours with a dose of castor oil.

Pepsinum.

PEPSIN.

"Pepsin" is a hypothetical term denoting the digestive principle of the gastric juice. As a definite body it is entirely unknown.

The substances used in medicine under the name of "pepsin" vary considerably in their properties, but all have the power, in greater or less degree, of dissolving or digesting albumen or fibrin.

"*Pure Pepsin*" is the name generally given to a solid substance separated from the gastric juice, or secretion from the mucous membrane of the hog. Sometimes it is precipitated by means of alcohol, and sometimes by chloride of sodium. Lately "pepsin" is made by macerating the stomach and its mucous membrane in acidulated water at 38° to 40° C., whereby the albuminoids are changed into peptones which are held in solution and are then obtained in a solid form by drying the concentrated fluid on glass plates.

When precipitated by means of chloride of sodium the pure pepsin is a gray, tough, leathery substance, partially soluble in water. When dried on glass plates the "pepsin" is in semi-transparent, yellowish granules or small scales. Prepared by either process it has a disagreeable odor. The dried semi-transparent scale pepsin dissolves entirely and quickly in water.

In the presence of hydrochloric acid pepsin dissolves coagulated albumen. The value of the pepsin depends not only upon the quantity of albumen dissolved by it, but even more upon the rapidity with which it exerts its peculiar solvent action.

Food passes through the stomach after two or three hours; the pepsin must, therefore, act within that period at the temperature of the stomach, if it is to be of any value.

Scheffer found that one grain of pure pepsin (precipitated by sodium chloride) was capable of dissolving three thousand grains of albumen *in a few days.* The Pharmacopœia prescribes a test for Saccharated

Pepsin which requires one grain to dissolve fifty grains of hard-boiled white of egg in "*five or six hours.*" It would seem that it is of greater importance to know what the pepsin will do in, say, two to three hours, as after that period it will probably have little effect in the stomach.

So-called "Pure Pepsin" (Peptonoid, or Peptone ?) may be considered very good if at a temperature of 38° to 40° C. (100° to 104° F.) one grain of it will dissolve three hundred grains hard-boiled white of egg, finely divided and suspended in about two ounces of water with thirty grains hydrochloric acid, within two to three hours.

The time required to digest the albumen depends very greatly upon its mechanical division. It should be quite as finely divided as well masticated food. When in pieces of the size of lentils, as prescribed in the German Pharmacopœia, the hard-boiled egg albumen will require several hours for its solution with any pepsin, whereas if beaten up into smooth pulp it will dissolve within less than an hour.

The pepsin of the German Pharmacopœia is required to be of such strength that one grain will digest one hundred grains egg albumen. It is, therefore, twice the digestive strength of the pepsin of the Pharmacopœia of the United States.

Pure pepsin in soluble, yellowish, and translucent scales sometimes digests as much as five hundred times its weight of albumen. To make the official saccharated pepsin from any pure pepsin of which one grain digests five hundred grains albumen, mix that pure pepsin by trituration with nine times its weight of powdered milk sugar.

Dose.—0.1 to 10 grams (2 to 150 grains), or more, with meals. The doses usually given are too small. It is better to give small doses frequently repeated than the full dose at once.

PEPSINUM SACCHARATUM; U. S.

Saccharated Pepsin.

Pepsin triturated with powdered sugar of milk.

Description and Tests.—See the Pharmacopœia, pages 247, 248.

It will be observed that the Pharmacopœia requires a pepsin of over four times the digestive power heretofore generally accepted as standard for saccharated pepsin. It has been considered that the saccharated pepsin is of sufficient digestive power when ten grains of it would dissolve one hundred and twenty grains egg albumen; the present official test requires ten grains to dissolve five hundred grains egg albumen.

Dose.—0.1 to 10 grams (2 to 150 grains), or more, with meals. On

account of the large quantity of sugar of milk in this preparation the doses are not larger than those of pure pepsin, as an excess of the sugar of milk may give rise to fermentation in the stomach.

PEPSINI LIQUOR; U. S.

Solution of Pepsin.

Liquid Pepsin.

Mix twelve grams (185 grains) hydrochloric acid with five hundred and forty-eight grams (18½ fluidounces) of water. Add forty grams (1 ounce 180 grains) saccharated pepsin, and shake well. Then add four hundred grams (14 ounces 48 grains) glycerin, shake, and set aside for twenty-four hours, after which filter.

Must not be unclear, discolored, mouldy, or have a disagreeable odor. It has an acidulous taste.

Medicinal Uses.—Similar to those of pepsin, but with the additional effects of hydrochloric acid. Useful in *apepsia*, and in some forms of *dyspepsia*.

Dose.—Five to twenty cubic centimeters (1 to 4 fluidrachms) with meals.

PEPSINI LIQUOR SERIPARUS.

Liquid Rennet.

Macerate fifteen calves' rennets with one hundred and eighty cubic centimeters (6 fluidounces) sherry wine, one hundred and fifty cubic centimeters (5 fluidounces) alcohol, and six hundred and eighty cubic centimeters (23 fluidounces) water for fifteen days. Filter.

Dose.—Dessertspoonful to tablespoonful.

PEPSINI VINUM SERIPARUM; G.

Rennet Wine.

The fourth stomach of a young calf is washed with cold water, and the mucous membrane scraped off. To thirty grams (463 grains) of this membrane is added two hundred and sixty grams (about 9 fluidounces) of white wine, and ten grams (150 grains) of sodium chloride (common salt). The whole is macerated three days, stirring frequently. It is then filtered, after which it is ready for use. Should be but slightly acid.

Dose.—Tablespoonful or more.

PEPSINI VINUM.

WINE OF PEPSIN.

Triturate fifty grams (1 ounce 330 grains) saccharated pepsin with one hundred and twenty cubic centimeters (4 fluidounces) sherry wine mixed with twenty-five cubic centimeters ($\frac{5}{6}$ fluidounce) diluted hydrochloric acid, until dissolved. Then add ninety cubic centimeters (3 fluidounces) sherry wine, filter, and finally add enough sherry through the filter to make the total filtrate measure five hundred cubic centimeters (17 fluidounces).

Dose.—Four to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

Percolation.

See article "Extracta Fluida."

Persio.

CUDBEAR.

A dark purplish-red powder prepared from Lecanora tartarea and other lichens. It is used chiefly in dyeing. The coloring matter dislves readily in diluted alcohol.

PERSIONIS TINCTURA.

TINCTURE OF CUDBEAR.

Made by percolation of thirty grams (1 ounce) cudbear with three hundred cubic centimeters (about 10 fluidounces) diluted alcohol.

This tincture is an excellent coloring agent for liquids, the rich color being especially suitable for acid preparations. Usually it will be found necessary to modify it more or less by the addition of caramel.

Peruvianum Balsamum; U. S.

BALSAM OF PERU.

Perubalsamum—Perubalsam, G. and Sw.; *Baume du Pérou, Baume des Indes*, F.; *Balsamo del Peru Liquido, Balsamo negro*, Sp.; *Peru Balsam.*

Origin.—*Myroxylon Pereiræ*, Klotzsch (*Leguminosæ*).

Habitat.—Central America.

Description and Tests.—See the Pharmacopœia, pages 52 and 53. The odor is one reminding of benzoin and vanilla.

Peru balsam is almost entirely insoluble in water, which only extracts

from it some cinnamic acid and a small quantity of cinnamein. As the balsam of Peru contains no volatile oil it is not a true balsam although containing cinnamic acid. It should have a pure agreeable balsamic odor. Often adulterated with alcohol, fixed oils, volatile oils, gurjun balsam, copaiba, etc., any of which may be detected by the pharmacopœial tests.

Constituents.—About six per cent. cinnamic acid, thirty per cent. resins, and about sixty per cent. cinnamein (benzyl cinnamate). By digestion with solution of potassa about sixty per cent. of the drug separates in the form of a yellowish-brown oily liquid, which has been improperly referred to as an "oil," but consists largely of cinnamein which is probably the most active constituent. Balsam of Peru yields some benzoic acid and a number of other bodies when subjected to dry distillation. The percentage of resin in the drug increases with its age, and the color darkens.

Medicinal Uses.—Balsam of Peru is a general stimulant, blennorrhetic, and expectorant. It is useful in checking an excessive secretion of mucus in *chronic bronchitis;* also of value in *intestinal catarrh* and *dysentery.* Externally it is used as an application to *chilblains, sore nipples, ulcers,* and as an ointment in *itch.* It is said to be quite as efficient as sulphur ointment for the latter purpose, and is much more agreeable. The *acarus scabiei* does not live longer than twenty to forty minutes in Peru balsam.

Dose.—Two grams (30 grains), in emulsion.

PERUBALSAMI SYRUPUS.

Syrup of Peru Balsam.

Digest thirty grams (1 ounce) balsam of Peru with three hundred and sixty cubic centimeters (12 fluidounces) hot water for two hours in a covered vessel, stirring frequently. Filter the water, and dissolve in it six hundred and fifty grams (23 ounces) sugar.

Used in cough mixtures.

Dose.—A teaspoonful or more.

PERUBALSAMI UNGUENTUM.

Peru Balsam Ointment.

Mix fifteen grams ($\frac{1}{2}$ ounce) balsam of Peru, 7.50 gram ($\frac{1}{4}$ ounce) glycerin, and one hundred and twenty grams (4 ounces) resin ointment.

A pleasant and efficient substitute for sulphur ointment for the cure of *itch.*

Petrolatum ; U. S.

PETROLEUM OINTMENT.

Vaselin, Cosmolin, Petrolina, Saxolin, Soft Petroleum Paraffinoid, Petroleum Butter.

Origin.—A mixture of semi-solid hydrocarbons obtained from American petroleum by distilling off the light and volatile constituents, the butter-like residue after hot filtration through animal charcoal constituting the "Petroleum Ointment."

Description.—It is yellowish, transparent in thin layers, fat-like, perfectly smooth, odorless, tasteless, and of neutral reaction. It may also be obtained nearly white. It is insoluble in alcohol and in water ; but soluble in sixty-four parts absolute alcohol, and quite readily in ether, chloroform, oil of turpentine, benzin, and in volatile and fixed oils.

Petroleum ointment does not turn rancid. The disagreeable odor occasionally observed in the preparation is probably in every instance due to faulty purification in its manufacture.

Tests.—As petroleum ointment does not saponify with alkalies, the admixture of fixed oils or fats may be detected by digesting four grams (60 grains) of it for half an hour with four grams of caustic soda and twenty-four grams (6 fluidrachms) of water ; then separating the watery liquid and neutralizing it with diluted sulphuric acid, when no fat or oil should separate. When melted and shaken with an equal bulk of sulphuric acid of 1.54 specific gravity, no dark color should appear within two hours ; if charred by this treatment the preparation is impure.

Melting Point.—The Pharmacopœia prescribes that when the melting point is not specified, the petroleum ointment which melts at about 40° C. (104° F.) is to be dispensed. This is the most suitable standard, and furnishes a product of proper consistence for most purposes. It agrees with the melting point of the most solid varieties of petroleum ointments now on the market, and is more firm than the article as first introduced, which is too soft. Petroleum ointment of 46° C. (115° F.) is also specified by the Pharmacopœia as official. This is intended for preparing cerates, but is much softer than cerate made of wax and lard, although it does not melt any sooner.

"Vaselin" melts at about 95° F. ; "Cosmolin" at about 97° to 100° F. ; and other similar products at higher degrees of temperature.

Uses.—The same as those of lard, simple ointment, and simple

cerate. It has the great advantage of not turning rancid, and the disadvantage of not penetrating or softening the skin as readily as animal fats and fixed oils do.

Petroleum.

PETROLEUM.

"*Oleum Petræ*," *Naphtha*—*Steinöl, Bergöl*, G.; *Pétrole, Huile mineral*, F.; *Petrolio, Aceite mineral*, Sp.; *Bergolja, Stenolja*, Sw.; *Coal Oil, Rock Oil.*

Crude petroleum varies in color from pale-straw to dark-brown, or almost black, and in density from a thin, limpid fluid to a thick molasses consistence. It is generally fluorescent with a bluish-green cast. Most petroleum is lighter that water, having about 0.80 or 0.90 specific gravity.

It is a mixture of numerous hydrocarbons, some liquid and others solid.

"Barbadoes Tar" and "Seneca Oil" are dark, thick varieties of petroleum.

Naphtha, benzin, rhigolene, etc., are clear, colorless liquids consisting of the lighter and more volatile hydrocarbons of petroleum. The term "naphtha" is frequently, and was originally, applied to the lighter varieties of crude petroleum. It is now used to designate all that portion of petroleum which distils over at below 50° C. (122° F.). By repeated fractional distillations the most volatile hydrocarbons are separated from the naphtha. *Coal oil* for illuminating purposes is a mixture of the less volatile hydrocarbons which do not boil until at a comparatively high degree of heat. *Benzin* consists of the more volatile portions, and is therefore more dangerously inflammable than coal oil. (See "Benzinum.")

Rhigolene boils at 1° C. (33.8° F.), and being thus extremely volatile, is also exceedingly explosive. It is a clear, colorless liquid, of a slight benzin-like odor. Must be kept in strong bottles only two-thirds filled, and kept in a very cool place—best in the cellar.

Medicinal Uses of Petroleum.—When taken internally it possesses blennorrhetic and anthelmintic properties. It is sometimes used in *chronic bronchitis, asthma*, etc., and also as an external application in various cutaneous eruptions.

Uses of Rhigolene.—It is employed with a hand atomizer to produce a cold temperature for local anæsthetic effect, but is seldom used. The vapor mixed with air is highly explosive.

Petroselini Radix.

PETROSELINUM ROOT.

Parsley Root.

Origin.—*Petroselinum sativum*, Hoffman (*Umbelliferæ*).

Habitat.—Cultivated.

Description.—A tapering, fleshy root, about fifteen centimeters (6 inches) long, and twelve millimeters ($\frac{1}{2}$ inch) thick, externally light brownish-yellow, wrinkled, marked by transverse ridges; the bark is thick, whitish within, and contains numerous resin cells; the wood is porous, yellowish. Odor aromatic; taste sweetish, aromatic.

Constituents.—The chief constituent is a volatile oil, of a pale-yellowish color, a faint parsley odor, and pungent taste. The root also contains a neutral principle called *apiin*, soluble in alcohol and water.

Medicinal Uses.—Carminative, diuretic, and emmenagogue. The fresh root is to be preferred.

Useful in *dropsy*, *strangury*, *gonorrhœa*, and in *amenorrhœa* and *dysmenorrhœa*, due to atony of the ovarian and uterine organs.

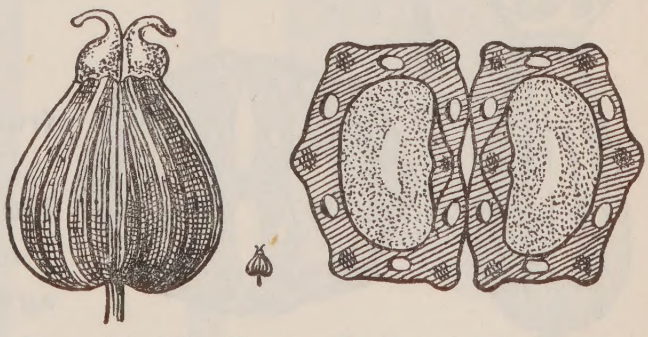
Dose.—Two to ten grams ($\frac{1}{2}$ to $2\frac{1}{2}$ drachms) in infusion or FLUID EXTRACT made with diluted alcohol as a menstruum.

Petroselini Fructus.

PARSLEY FRUIT.

Petroselini Semina.

Description.—The dried ripe fruits are grayish-green, roundish-ovate, laterally compressed. They have an aromatic odor and taste. See the illustrations.



FIGS. 404–406.—Parsley Fruit, natural size, enlarged, and transverse section, enlarged.

Constituents.—*Volatile oil* and *apiol*. The volatile oil is present to the extent of from 0.8 to 3.2 per cent., is colorless or pale greenish-yellow, has the specific gravity 1.015 to 1.144, and is soluble in about twice to three times its weight of alcohol.

APIOL is a colorless liquid, probably a mixture of several substances. It forms an emulsion with alkalies; is insoluble in water, but readily soluble in alcohol, ether, and chloroform. It has 1.078 specific gravity,

and becomes turbid at −12° C. (10.4° F.) without solidifying. We have seen a green liquid sold as "*apiol.*"

Medicinal Uses.—Aromatic, stimulant, diuretic, carminative.

Apiol in **doses** of 0.50 to 1 gram (8 to 16 minims) is a general excitant, said to act about the same as coffee, and was at one time much praised as a substitute for quinine.

Phalaris Fructus.

CANARY SEED.

Bird Seed.

Origin.—*Phalaris canariensis*, Linné (*Graminaceæ*).

Habitat.—The Mediterranean shores.

Part used.—The fruit.

Description.—About four millimeters ($\frac{1}{6}$ inch) long, elliptic, flattened, glossy, pale-yellowish, interiorly white. Inodorous; slightly bitter.

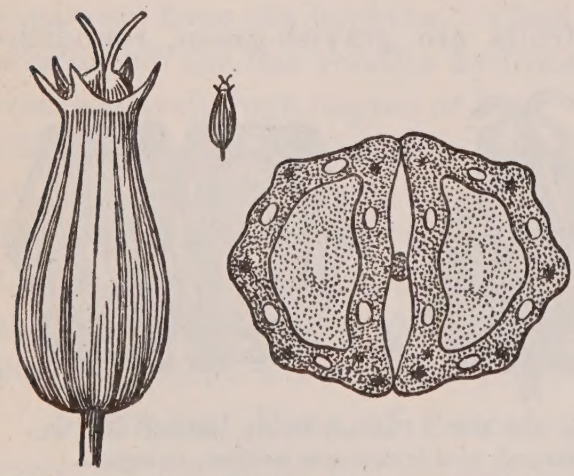
Constituents.—Starch, gluten, and fat.

Uses.—Mainly used as bird seed. The crushed seed has been used for poultices.

Phellandrii Fructus.

PHELLANDRIUM FRUIT.

"*Phellandrii Semina*"—*Wasserfenchel*, G.; *Fenouil d'eau*, F.; *Felandrio*, Sp.; *Stäkrefrön*, Sw.; *Water-fennel.*



FIGS. 407–409.—Phellandrium, natural size, enlarged, and transverse section, enlarged.

Origin.—*Œnanthe phellandrium*, Lamarck (*Umbelliferæ*).

Habitat.—Asia and Europe.

Part used.—The dried ripe fruit.

Description.—Brownish-green, formed as seen in the illustrations. The odor is aromatic, rather disagreeable; taste aromatic, bitterish.

Constituents.—Volatile oil, and phellandrol.

Medicinal Uses.—Said to be stimulant, diaphoretic, diuretic, and expectorant. Useful in *chronic bronchorrhœa*, etc.

Dose.—One to two grams (15 to 30 grains) in powder or in FLUID EXTRACT made with alcohol as a menstruum.

PHELLANDRII INFUSUM.

INFUSION OF PHELLANDRIUM.

From thirty grams (about 1 avoirdupois ounce) of the drug make ve hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Fifteen to thirty cubic centimeters ($\frac{1}{2}$ to 1 fluidounce) sev-ral times daily.

Phlorizinum.

PHLORIZIN.

A bitter glucoside, in colorless or white silky prismatic needles, ob-ained from the root-bark of apple, pear, cherry, plum, and poplar trees. t is odorless, freely soluble in hot water, and in alcohol. It resembles alicin.

Medicinal Uses.—Has been used as a substitute for quinine in **oses** of 0.6 to 1.25 gram (10 to 20 grains).

Phoradendron.

PHORADENDRON.

American Mistletoe.

Origin.—*Phoraden-ron flavescens*, Nuttall (*Loranthaceæ*).

Habitat.—Northern art of the United States.

Part used.—The whole arasitic plant.

Description.—See he illustration. Much ranched, jointed, yellow-sh-green. Odor, heavy, isagreeable ; taste, bitter, omewhat astringent.

Constituents.—A enacious substance called *iscin* ("bird-lime" or bird-lue), resin, fixed oil, tan-in, and various salts.

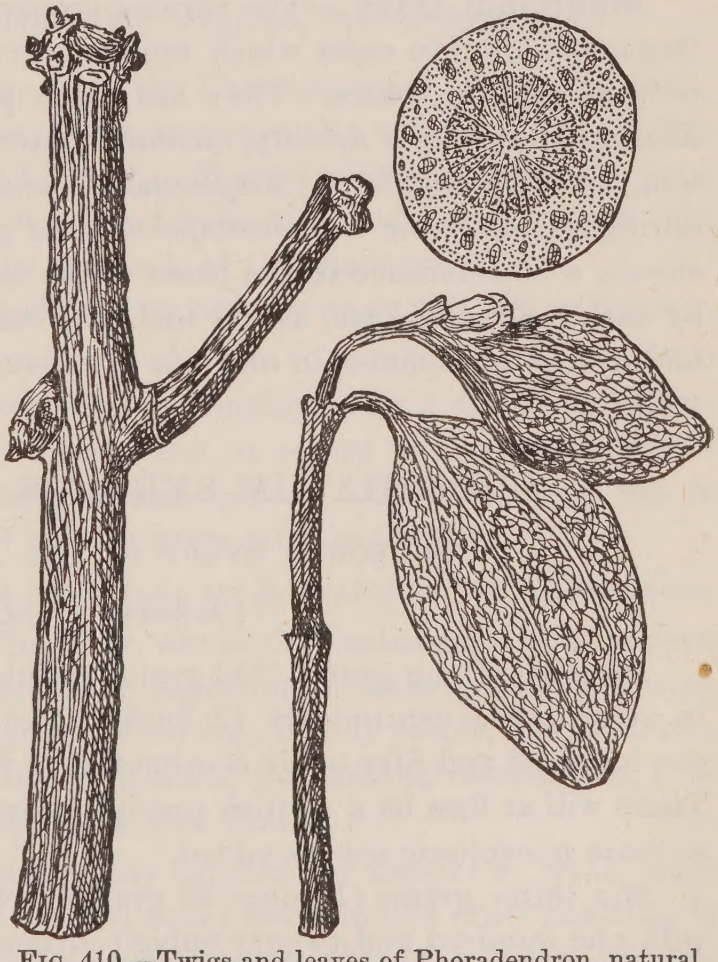


FIG. 410.—Twigs and leaves of Phoradendron, natural size, and transverse section of twig, enlarged.

Medicinal Uses.—Has been strongly recommended as an oxytocic in preference to ergot. Also to check *hemorrhages*. Was formerly employed in *epilepsy*, *hysteria*, etc.

Best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum, of which the **dose** is one to four cubic centimeters (15 to 60 minims).

Phosphates.

PHOSPHATES.

Phosphates of calcium, sodium, potassium, iron, etc., are used under the supposition that they supply to the body both phosphorus and the several bases named. The acid phosphates and phosphoric acid itself are used for the same purpose and with the same object in view. The acid phosphates are usually held in solution in water by a small quantity of free phosphoric acid. Unquestionably as good a preparation of this kind as has been or can be made is the compound syrup of the phosphates of the late Professor Parrish. An improved formula for this preparation is given below.

Medicinal Uses.—The various preparations of the phosphates are frequently used in cases which require nervine tonics or stimulants, as well as general tonics. They are often prescribed in chronic *wasting diseases* and *general debility*, *mental* and *nervous exhaustion* and *prostration*, *morbid excitability*, *sleeplessness*, *sexual derangements* or *excesses*, during *lactation* or in *consumption;* the particular preparation being chosen with reference to the bases of the salts which are most indicated by each individual case, as, for instance, calcium phosphates during *lactation*, iron phosphates in *anæmia* or *consumption*, etc.

PHOSPHATUM SYRUPUS COMPOSITUS.

COMPOUND SYRUP OF THE PHOSPHATES.

Chemical Food.

Dissolve fifteen grams (230 grains) soluble phosphate of iron (1880) in sixty cubic centimeters (2 fluidounces) hot water. Add gradually one hundred and fifty cubic centimeters (5 fluidounces) phosphoric acid. There will at first be a whitish precipitation, which, however, redissolves as more phosphoric acid is added.

Mix thirty grams (1 ounce 25 grains) precipitated calcium phosphate with one hundred and twenty cubic centimeters (4 fluidounces) boiling water; then add gradually enough hydrochloric acid to entirely dissolve the powder. Filter the solution. Now add one liter (34 fluidounces) water, and then ammonia water in slight excess to re-precipitate the phosphate of calcium. Collect the precipitate on a filter and wash it

thoroughly until the washings are no longer precipitated by solution of silver nitrate.

Dissolve the freshly precipitated and washed phosphate of calcium, while still wet, in the acid solution of phosphate of iron. Then add five grams (77 grains) phosphate of sodium, and four grams (60 grains) carbonate of potassium. Filter the solution. Then add enough water to make the whole measure four hundred and fifty cubic centimeters (15¼ fluidounces). In this dissolve without the aid of heat eight hundred grams (28 ounces) sugar. Color the syrup with a few drops tincture of cudbear, and flavor it with about thirty cubic centimeters (1 fluidounce) orange-flower water.

Dose.—One or two teaspoonfuls.

Phosphorus; U. S.

PHOSPHORUS.

Phosphor, G.; *Phosphore*, F.; *Fosforo*, Sp.; *Fosfor*, Sw.

Description and Tests.—See the Pharmacopœia, pages 248, 249.

It usually contains arsenic, and sometimes also sulphur. The limits of these impurities are fixed in the Pharmacopœia. Must be kept under water, best in a glass-stoppered wide-mouthed bottle placed in a tin can filled with water up to the neck of the glass bottle.

The sticks of phosphorus should be clear or waxy, not red or brown, externally.

Medicinal Uses.—Phosphorus is employed as a nutritive stimulant to the nervous system. It is given in *sexual* and *mental exhaustion*, *general debility*, *nervous depression*, etc. Long-continued use is apt to derange the digestion and interfere with nutrition.

Dose.—0.0006 to 0.0012 gram ($\frac{1}{100}$ to $\frac{1}{50}$ grain) in pill or emulsion.

Poisonous Effects.—In large doses this substance is a violent poison, producing, some hours after ingestion, intense gastro-intestinal irritation, accompanied by nausea, vomiting, bloody stools, intense burning pains in abdomen, jaundice, general depression, restlessness, progressing to delirium, coma, collapse, and death.

Antidotes.—Emetics, preferably sulphate of copper in weak solution, 0.1 to 0.2 gram (2 to 3 grains) every few minutes until vomiting is induced. Oil of turpentine in emulsion or solution of sulphate of copper, with opium to restrain vomiting, may then be given to prevent the poisonous effects of the phosphorus. The irritation and depression must be counteracted on general principles.

PHOSPHORATUM OLEUM; U. S.

Phosphorated Oil.

Put one hundred grams (3 ounces 230 grains) expressed oil of almond into a flask and heat it on a sand-bath to 250° C. (482° F.), and keep it at that temperature for about fifteen minutes. Then allow it to cool and filter it. Put ninety grams (3 ounces 76 grains) of the almond oil so prepared and filtered, together with one gram (15⅓ grains) phosphorus, previously carefully dried with blotting-paper and cut in thin pieces, into a perfectly dry bottle (rinsed with ether so as to dry faster) capable of holding more than one hundred grams (say a four-ounce bottle). Cork the bottle; place it in a water bath and heat it until the phosphorus melts. Then shake it until all the phosphorus has dissolved. Allow it to cool. Add nine grams (139 grains) stronger ether and shake well together.

Phosphorated oil must be kept in small, amber, glass-stoppered bottles in a cool place. When kept in a too cold place the phosphorus crystallizes out; it will redissolve again, however, when heated and shaken.

The phosphorus used should be one which withstands the pharmacopœial tests for arsenic and sulphur. The preparation contains one per cent. phosphorus.

Medicinal Uses.—A convenient form for the administration of phosphorus. It is sometimes combined with cod-liver oil and administered in *consumption, wasting diseases, general debility, nervous exhaustion*, etc.

Dose.—0.06 to 0.2 cubic centimeter (1 to 3 minims).

PHOSPHORI PASTA.

Phosphorus Paste.

Make a mush by boiling thirty grams (1 ounce) flour with a sufficient quantity of water. Add 1.50 gram (23 grains) phosphorus, keep in under the surface of the mush, and put the whole on a water-bath until the phosphorus is melted. Then stir it into the mush well, and add twenty grams (300 grains) suet, ten grams (150 grains) olive oil, and fifteen grams (½ ounce) sugar. Mix all intimately, and put the finished paste into tin cans, or pots, which must be tightly closed.

This makes an efficient rat-poison.

PHOSPHORI PILULÆ; U. S.

PHOSPHORUS PILLS.

Dissolve 0.06 gram (1 grain) phosphorus in 3.20 grams (50 grains) purified chloroform in a test-tube. Mix in a mortar 5.20 grams (80 grains) powdered althæa and 1.30 gram (twenty grains) powdered acacia. Add the solution of phosphorus, 2.60 grams (40 grains) glycerin, and 1.30 gram (20 grains) water, and mix all quickly, working it into a mass, which divide into one hundred pills.

Coat these pills by shaking them about in a solution of balsam of tolu in an equal weight of stronger ether, and dry them.

Keep the pills in a well-closed bottle.

Phosphorus which holds the pharmacopœial tests for arsenic and sulphur must be used.

Each pill contains 0.0006 gram ($\frac{1}{100}$ grain) of phosphorus.

PHOSPHORI PULVIS.

POWDERED PHOSPHORUS.

Drop phosphorus in small shavings into a bottle half filled with solution of sodium chloride (table salt). Warm the whole until the phosphorus melts. Then shake it until cold. The phosphorus will then be in powder. Pour off the salt brine and wash the powdered phosphorus with water. Preserve it in a bottle under water.

Used in making pills.

PHOSPHORI TINCTURA.

TINCTURE OF PHOSPHORUS.

Dissolve one gram ($15\frac{1}{3}$ grains) phosphorus in one thousand cubic centimeters (34 fluidounces) absolute alcohol.

Each cubic centimeter (16 minims) contains one milligram ($\frac{1}{64}$ grain) phosphorus.

Must be kept in an amber-colored bottle with well-fitting glass stopper.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Physostigma; U. S.

PHYSOSTIGMA.

Physostigmæ Semina—Calabar Bean.

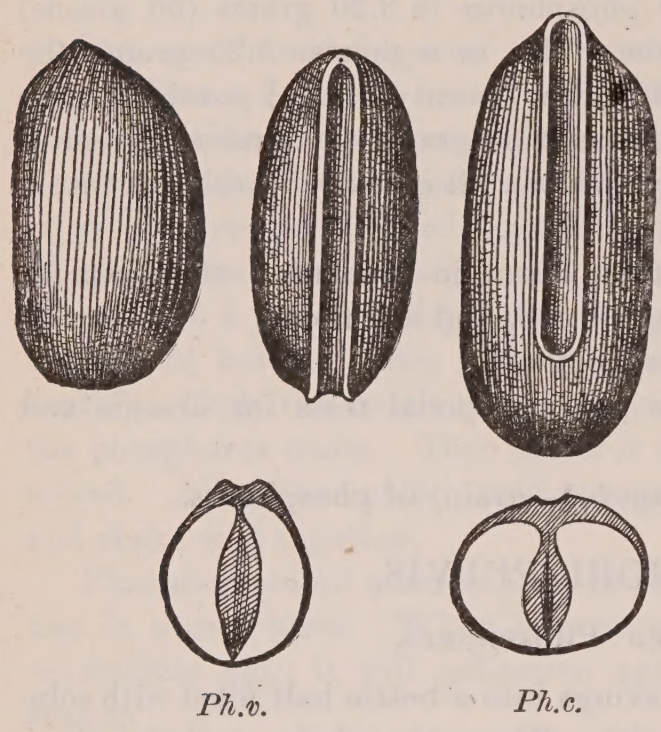
Origin.—*Physostigma venenosum*, Balfour (*Leguminosæ*).

Habitat.—Western Africa, near the mouth of the river Niger.

Part used.—The seed.

Description.—See the Pharmacopœia, page 249.

The seed of *Physostigma cylindrospermum*, Holmes, resembles the true Calabar bean, but is much larger, nearly cylindrical, and has a much shorter groove and hilum.



FIGS. 411–415.—*Ph.v.*, Physostigma venenosum, and transverse section; *Ph.c.*, Physostigma cylindrospermum, and transverse section; all natural size.

Constituents.—The alkaloid *physostigmine* (also called *eserine*), and *calabarine*, besides starch, fixed oil, etc.

Medicinal Uses.—Physostigma is a powerful poison in excessive doses, producing extreme debility, vomiting, slow and weak pulse, collapse, and death.

It is sometimes called "ordeal bean," being used in Africa in the form of an infusion as an ordeal.

It is mainly employed to cause contraction of the pupil, and is of use in various eye diseases, as in *iritis*, in preparing the patient for the operation of *iridectomy*, or to counteract the excessive effects of atropin.

It has also proved of service in *tetanus*, *neuralgia*, and other affections accompanied by *pain*.

Dose.—About 0.06 gram (1 grain) of the powder, gradually increasing the dose.

PHYSOSTIGMATIS EXTRACTUM; U. S.

Extract of Physostigma.

Moisten five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of physostigma, in No. 30 powder, with two hundred grams ($8\frac{1}{3}$ fluidounces) alcohol. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate.

Reserve four hundred and fifty grams (about 18 fluidounces) of *first percolate*. Continue the percolation until the percolate passes through but slightly bitter, or until one thousand and fifty grams of *second percolate* has been received. Evaporate the second percolate to fifty grams

(2 fluidounces); then mix this with the first percolate, and evaporate the whole to extract, stirring well at the last. No glycerin is added.

Greenish-brown. Yield about six per cent. Contains some fixed oil on account of the use of undiluted alcohol as a menstruum. This does not interfere with the medicinal effect, although undesirable.

Practically the same product is obtained by evaporating the fluid extract.

When well made, one grain of this extract represents twenty-four grains of the Calabar bean.

Dose.—0.004 to 0.01 gram ($\frac{1}{16}$ to $\frac{1}{6}$ grain).

PHYSOSTIGMATIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PHYSOSTIGMA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.2 cubic centimeter (1 to 3 minims).

PHYSOSTIGMATIS TINCTURA; U. S.

TINCTURE OF PHYSOSTIGMA.

Tincture of Calabar Bean.

Macerate thirty grams (1 ounce $25\frac{1}{2}$ grains) physostigma, in No. 40 powder, with thirty cubic centimeters (1 fluidounce) alcohol for twenty-four hours. Then pack it tightly into a cylindrical percolator, and percolate with alcohol until three hundred grams (10 ounces 255 grains) tincture has been obtained (measuring three hundred and sixty cubic centimeters or 12 fluidounces).

Dose.—One to two cubic centimeters (15 to 30 minims).

Physostigminæ Salicylas; U. S.

SALICYLATE OF PHYSOSTIGMINE.

Salicylate of Eserine.

Description and Tests.—See the Pharmacopœia, page 249.

This is the most permanent and satisfactory of all the salts of physostigmine, and has therefore been made official in preference to the sulphate and all other preparations.

Must be kept in well-corked, dark, amber-colored bottles in a dark place.

Dose.—0.00075 gram ($\frac{1}{80}$ grain), gradually increased if necessary. Should be used with extreme caution!

For use in the eye a solution of 0.06 gram (1 grain) in thirty cubic centimeters (1 fluidounce) of water may be employed.

Physostigminæ Sulphas.

SULPHATE OF PHYSOSTIGMINE.

Sulphate of Eserine.

A white crystalline salt. Does not keep so well as the salicylate.

Uses and **Dose** about the same as of salicylate of physostigmine.

Phytolaccæ Bacca; U. S.

PHYTOLACCA BERRY.

Poke-Berry.

Origin and Habitat.—See *Phytolaccæ Radix.*

Description.—See the Pharmacopœia, page 250. Dark purple, about the size of juniper berries.

Constituents.—No satisfactory analysis.

Medicinal Uses.—Poke-berries have been used for the same purposes as the root. We have seen excellent results from the use of a saturated tincture, made by macerating the berries in whiskey, in *chronic rheumatism* with painful swelling of the joints.

Dose.—0.2 to 2 grams (8 to 30 grains).

PHYTOLACCÆ FRUCTUS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PHYTOLACCA BERRIES.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 20 powder.

As a *menstruum* use diluted alcohol.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Phytolaccæ Radix; U. S.

PHYTOLACCA ROOT.

Poke-Root.

Origin.—*Phytolacca decandra*, Linné (*Phytolaccaceæ*).

Habitat.—North America.

Description.—See the Pharmacopœia, page 250. The dust or

powder causes distressing symptoms, including pain about the chest, abdomen, and back, and of the eyes, and occasionally vomiting or purging, or both. These symptoms come on, if at all, in a few hours, and do not disappear for a day or two. One of the authors witnessed these effects on two occasions when poke-root was being ground, the dust being more or less carried through the building. The miller himself, and one or two other persons who must have inhaled much more of the dust than the other inmates of the building were not affected at all, while some were so prostrated as to require assistance to reach their homes, and were unable to leave their beds the following day. One man who was engaged in moistening the powder preparatory to packing it into a percolator had his arms nearly blistered and "raw" from the effects of the drug.

Constituents.—Resin has been found in it. The active principle is not yet known.

Medicinal Uses.—Emetic, cathartic, alterative, and narcotic. It is seldom employed as a cathartic or emetic, on account of the slowness of its action and the liability to be followed by symptoms of narcotic poisoning. It is used as an alterative in *syphilis*, *rheumatism*, *scrofula*, and in *cutaneous disorders*.

Dose.—As an emetic and purgative, one to two grams (15 to 30 grains); as an alterative, 0.05 to 0.35 gram (1 to 6 grains).

PHYTOLACCÆ ABSTRACTUM.

ABSTRACT OF PHYTOLACCA.

Abstract of Poke-Root.

Prepared from the fluid extract, four hundred cubic centimeters (13½ fluidounces) of which will make two hundred grams (7 ounces 24 grains) of the abstract, using a sufficient quantity of powdered milk-sugar.

Dose.—0.05 to 0.60 gram (1 to 10 grains).

PHYTOLACCÆ RADICIS EXTRACTUM.

EXTRACT OF PHYTOLACCA ROOT.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.30 gram (2 to 5 grains).

PHYTOLACCÆ [RADICIS] EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PHYTOLACCA ROOT.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

PHYTOLACCÆ [RADICIS] TINCTURA.

TINCTURE OF PHYTOLACCA ROOT.

Tincture of phytolacca is made by percolation with diluted alcohol, three hundred cubic centimeters (10 fluidounces) of tincture being collected from thirty grams (or 463 grains) of the drug, in No. 50 powder.

Dose.—Two to ten cubic centimeters (½ to 2½ fluidrachms).

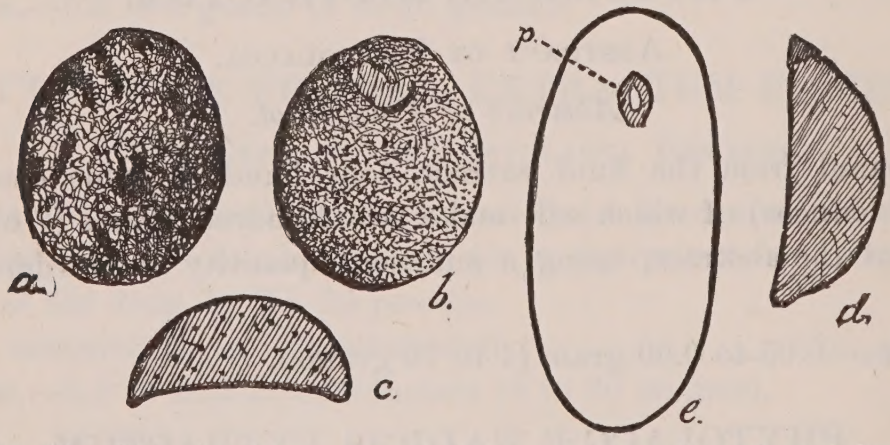
Pichurim Semina.

PICHURIM BEANS.

Origin.—*Nectandra puchury*, Nees (*Lauraceæ*).

Habitat.—Brazil.

Part used.—The dried cotyledons.



FIGS. 416–420.—Pichurim Beans, natural size. *a*, outer surface of cotyledon; *b*, inner surface; *c*, transverse section; *d*, longitudinal section of same; *e*, outlines of inner surface of large variety (*p*, plumule).

Description.—Blackish-brown externally, but interiorly light brown. Odor and taste aromatic, reminding of nutmeg and saffron. See illustrations.

Constituents.—From two to three per cent. volatile oil, and about thirty per cent. fat.

Medicinal Uses.—This drug has been used as a stimulant, tonic, and astringent in *bowel affections*, *diarrhœa*, *dysentery*, and *dyspepsia*, in *menstrual derangements*, etc.

Dose.—0.5 to 1.5 gram (8 to 22 grains) in powder.

Picrotoxinum; U. S.

PICROTOXIN.

A white, crystalline, neutral principle prepared from the seeds of *Anamirta paniculata*, Colebrooke (*Menispermaceæ*).

The poisonous principle of the Cocculus Indicus is picrotoxin. (See "Cocculus Indicus.")

Description and Tests.—See the Pharmacopœia, page 250.

Medicinal Uses.—Picrotoxin has been used externally to cure *porrigo*, in the form of ointment made with 0.66 gram (10 grains) of picrotoxin in thirty grams (1 ounce) of ointment. It has also been given internally or by subcutaneous injection in *epilepsy*.

Dose.—0.001 gram ($\frac{1}{60}$ grain) or less, given with care.

Pilocarpinæ Hydrochloras; U. S.

HYDROCHLORATE OF PILOCARPINE.

Muriate of Pilocarpine.

This is the hydrochlorate of the alkaloid of jaborandi. Must be kept in small vials with well-fitting glass stoppers.

Description and Tests.—See the Pharmacopœia, pages 250 and 251.

Impure pilocarpine has an offensive odor, and is more or less dark colored. The pharmacopœial preparation must be white and odorless.

Medicinal Uses.—Same as of pilocarpus.

Dose.—0.01 gram ($\frac{1}{6}$ grain) hypodermically.

Pilocarpus; U. S.

PILOCARPUS.

Pilocarpi Folia—Jaborandi.

Origin.—*Pilocarpus pinnatifolius*, Lemaire (*Rutaceæ*).

Habitat.—Brazil.

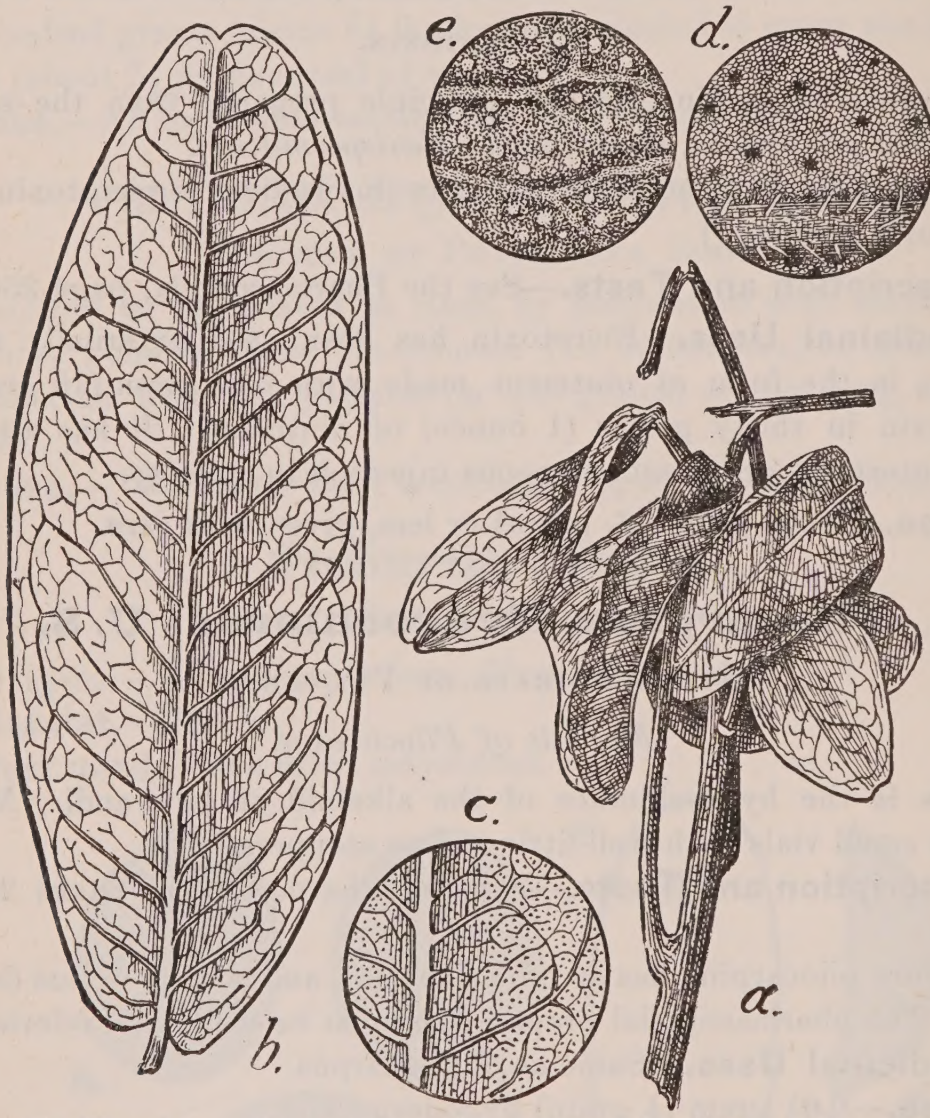
Part used.—The leaflets.

Description.—See the Pharmacopœia, page 251. See also the illustrations.

Must have a good, sound, not brown, color.

Constituents.—The alkaloid *pilocarpine*, which is present to the extent of one-fourth to one-half per cent. Also *volatile oil.*

Medicinal Uses.—Pilocarpus is a powerful diaphoretic and sialagogue. When swallowed on an empty stomach it may excite vomiting,



FIGS. 421–425.—Jaborandi. *a*, twig, with leaves, reduced; *b*, leaflet, natural size; *c*, lower surface, slightly enlarged, showing gland dots; *d*, same, more highly enlarged by reflected light; *e*, same as last, by transmitted light.

to prevent which it has been given by enema, or preferably small doses of brandy and water are taken before administering the dose.

When a dose of this remedy is taken, profuse perspiration and flow of saliva occur. The secretion from the bronchial and nasal mucous membranes and the lachrymal glands are also increased. The temperature of the body is lowered, and the arterial tension reduced. Good results have been observed from this drug in *dropsy*, *uræmia* from *desquamative nephritis*, *chronic parenchymatous nephritis*, *bronchitis*

with *asthma*, *asthma siccum*, *acute ophthalmia*, and *diabetes insipidus*. It has also been successfully employed to eliminate mineral poisons, and to increase the flow of milk in nursing women.

Dose.—Two to eight grams (30 to 120 grains), best given as fluid extract.

PILOCARPI ABSTRACTUM.

ABSTRACT OF PILOCARPUS.

Prepare two hundred grams (7 ounces 24 grains) finished abstract from four hundred cubic centimeters (13½ fluidounces) of the fluid extract, using a sufficient quantity of powdered milk sugar.

Dose.—One to four grams (15 to 60 grains).

PILOCARPI EXTRACTUM.

EXTRACT OF PILOCARPUS.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brown.

Dose.—0.10 to 0.50 gram (2 to 8 grains).

PILOCARPI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF PILOCARPUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to eight cubic centimeters (30 to 120 minims).

PILOCARPI INFUSUM.

INFUSION OF PILOCARPUS.

From fifty grams (about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Fifteen to twenty cubic centimeters (4 to 5 fluidrachms) repeated three or four times at intervals of ten or fifteen minutes.

Pilulæ.

PILLS.

Pillen, G.; *Pilules*, F.; *Píldoras*, Sp.; *Piller*, Sw.

Spherical masses of medicine, intended to be swallowed whole. They vary in weight from three to forty centigrams ($\frac{1}{2}$ to 6 grains). Ordinarily they are soft, and consist of substances readily dissolved or disintegrated by water or by the fluids of the stomach.

Boli are larger than pills. *Granulæ* (granules) are smaller.

In the extemporaneous preparation of pills the following may be useful suggestions:

The mortar should be a perfect one, with perfectly smooth and well-formed bottom, and a well-formed pestle to match. It is better to use a rather large mortar than one that is too small. Wedgewood mortars are usually excellent.

The ingredients should, as a rule, be weighed out in the order of their bulk, commencing with that of which the smallest quantity is to be used; and the two ingredients used in the smallest quantities must be well mixed before the third ingredient is added, etc.

A perfect pill-mass is one which is quite uniform throughout, showing no particles of any one of the ingredients in the mass, has a sufficiently firm consistence to make pills which will retain their shape, and yet soft enough to be readily formed, which does not dry to hardness or fall to powder, and which does not stick to the fingers. If proper ingredients or excipients are used, and the mass is well worked, it will at last become loosened from the bottom of the mortar and the end of the pestle.

Finally, the pills must be of exactly equal size and perfect spherical form. Lenticular and oblong or oval pills are absurdities.

The "excipients" to be used are such as will best form the pill-mass with the medicaments prescribed. In probably nine-tenths of all formulæ for pills, whether extemporaneously made or not, the best excipients are water, glycerin, and powdered tragacanth, one or two of which substances will prove sufficient. The least quantity of excipient which

will accomplish the end in view is the proper quantity to use. A very minute quantity of powdered tragacanth will impart proper tenacity, and a minute quantity of glycerin will keep the pills permanently soft.

Quinine pills should be made with simply the sulphate of quinine and a very small quantity of glycerin, the hands and tools of the operator to be scrupulously clean.

The best "conspergative" for pills, to keep them from adhering together and from losing their shape, is lycopodium, which may be used for all pills, except those which are white and such as contain large quantities of volatile oil. For white pills dusted talc is the nicest conspergative, and this may also be used for pills containing volatile oils.

Ready-made tragacanth paste, or tragacanth in glycerin, or any other mucilaginous or other mixture for making pill-masses should be banished from the dispensing counter; and a bottle of dry, finely powdered tragacanth, and other bottles containing respectively pure glycerin and distilled water should take their place. Powdered liquorice root as a pill excipient and a conspergative is very crude, and should give place to lycopodium and dusted talc.

Coated pills are not at all objectionable, provided the coating is entirely and freely soluble, and is put on by a process which does not expose the pills to any injurious influences, such as excessive heat, etc.

Pimenta; U. S.

PIMENTA.

Pimentæ Fructus—Allspice.

Origin.—*Eugenia Pimenta*, De Candolle (*Myrtaceæ*).

Habitat.—Tropical America.

Part used.—The nearly ripe fruit.

Description.—See the Pharmacopœia, page 256.

Constituents.—From three to four per cent. volatile oil, resin, etc.

Uses.—Allspice is an aromatic stimulant, mainly employed as a spice to promote appetite and digestion.

Sometimes used as a carminative in the form of a FLUID EXTRACT made with alcohol as a menstruum, of which the **dose** is 0.5 to 2.5 cubic centimeters (8 to 40 minims).

Pimentæ Oleum; U. S.

OIL OF PIMENTA.

Pimentæ Ætheroleum—Volatile Oil of Pimenta, Oil of Allspice.

Description and Tests.—See the Pharmacopœia, page 241.

Dose.—One to five drops.

PIMENTÆ AQUA.

PIMENTA WATER.

Distribute two grams (30 grains) volatile oil of pimenta on four grams (60 grains) absorbent cotton, and percolate through it one liter (34 fluidounces) water. (See article "Aquæ Aromaticæ.")

Dose.—Fifteen to thirty cubic centimeters (½ to 1 fluidounce) for an adult.

PIMENTÆ SPIRITUS.

SPIRIT OF PIMENTA.

Mix thirty cubic centimeters (1 fluidounce) volatile oil of pimenta and one thousand cubic centimeters (34 fluidounces) alcohol.

Dose.—Two to eight cubic centimeters (½ to 2 fluidrachms).

Pimpinella.

PIMPINELLA.

Pimpinell-wurzel, Biebernell, G.; *Grand Boucage*, F.; *Pimpernel, Small Burnet Saxifrage.*

Origin.—*Pimpinella saxifraga*, Linné (*Umbelliferæ*).

Habitat.—All over Europe.

Part used.—The root.

Description.—From ten to thirty centimeters (4 to 12 inches) long, simple or branched, spongy, fleshy, from the thickness of a finger down to that of a quill, grayish- or brownish-yellow at the large end, and marked by warts, transverse rings, and longitudinal wrinkles. The lower portions are of a paler yellowish color, and marked by deep wrinkles (lengthwise). Internally whitish, with reddish-yellow rays (resin ducts). The bark is of about equal thickness with the woody portion, which is yellowish-white, pithless. Odor aromatic, spicy; taste pungent, acrid.

Constituents.—A golden yellow volatile oil, with a strong odor reminding of parsley seed, and an acrid taste; also about ten per cent. acrid resin, and some benzoic acid.

Medicinal Properties.—Stimulant, blennorrhetic, diaphoretic, diuretic, and expectorant. Promotes the secretions generally.

Used in *chronic catarrhs, bronchitis, bronchial blennorrhœas, gastric catarrh* with *flatulence* or *dyspepsia*, etc.

Dose.—One to two grams (15 to 30 grains), preferably in fluid extract.

Pinus Canadensis.

PINUS CANADENSIS.

Pini Canadensis Cortex—Hemlock Spruce Bark.

Origin.—*Abies canadensis*, Michaux (*Coniferæ*).

Habitat.—North America.

Part used.—The bark.

Description.—Rough, grayish-brown externally, with corky layer oth longitudinally and transversely deeply furrowed ; inner side light ellowish-brown ; odor tan-like ; taste very astringent.

Constituents.—Chiefly tannin, but also volatile oil.

Medicinal Uses.—Hemlock spruce bark is used as a stimulating ennorrhetic and astringent, proving valuable in cases of *diarrhœas* ue to atonic condition of the bowels, as in *dysentery*, etc. Best given the form of fluid extract.

PINI CANADENSIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PINUS CANADENSIS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. uidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois unces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of ne hundred grams (about 4⅙ fluidounces) alcohol to every two hundred rams (about 6⅔ fluidounces) of water.

Dose.—One to two cubic centimeters (15 to 30 minims).

Piper ; U. S.

PEPPER.

Piperis Nigri Fructus—Black Pepper.

Origin.—*Piper nigrum*, Linné (*Piperaceæ*).

Habitat.—India.

Part used.—The dried unripe fruit.

Description.—See the Pharmacopœia, page 257.

Constituents.—From one to two per cent. volatile oil, pungent esin, piperin, etc.

Medicinal Uses.—Pepper is generally employed as a condiment

and spice to improve digestion and correct a tendency to flatulence. I is a stimulant carminative, and is sometimes given in *flatulence* an *atonic conditions* of the stomach and bowels. It has also been used i *intermittent fevers*, but with doubtful benefit.

Dose.—0.3 to 1.5 gram (5 to 20 grains).

PIPERIS CONFECTIO; B.

Confection of Pepper.

Made of sixty grams (2 ounces) black pepper, finely powdered ninety grams (3 ounces) caraway, in fine powder; and four hundre and fifty grams (15 ounces) clarified honey.

A smooth, uniform, firm pasta of a dark olive brown color.

Possessing the properties of black pepper.

Dose.—Four to eight grams (60 to 120 grains).

PIPERIS EXTRACTUM FLUIDUM.

Fluid Extract of Black Pepper.

To make five hundred cubic centimeters (or its equivalent—17 U. S fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupoi ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.25 to 1.5 cubic centimeter (4 to 20 minims).

PIPERIS OLEORESINA; U. S.

Oleoresin of Pepper.

Pack one thousand grams (35 ounces 120 grains) pepper, in No. 6 powder, firmly into a tall, narrow, cylindrical percolator provided wit cover and receptacle adapted to operations with volatile menstrua (se page 721), and percolate it slowly with stronger ether until one thou sand five hundred grams (about 68 fluidounces) percolate has slowl passed. Recover about one thousand grams of the ether by distillatio on a water-bath, put the residue into a porcelain evaporating dish an expose it until the remaining ether has evaporated spontaneously an the deposit of crystals of piperin has ceased. Finally, strain the oleo resin through muslin, by expression, to separate the piperin from it.

Keep the product in small well-corked wide-mouthed bottles.

Dose.—0.015 to 0.06 gram (¼ to 1 grain), best given in pill.

Piper Album.

WHITE PEPPER.

Piperis Semina.

Origin.—*Piper nigrum*, Linné (*Piperaceæ*).

Part used.—The ripe fruit deprived of the epicarp and sarcocarp. In other words, the seeds with the adhering testa and the vascular bundles covering its surface.

Description.—Smooth, spherical, with ten to twelve longitudinal veins; whitish externally; interiorly reddish-brown; odor and taste the same as of black pepper but weaker.

Constituents.—The same as of the black pepper.

Medicinal Uses.—The same as of black pepper, but weaker.

Rarely used in medicine.

Piperina; U. S.

PIPERINE.

Piperinum—Piperin.

This substance is probably a piperate of piperidine, and not an alkaloid. Should therefore be called piperin*um*—not piperina. When acted upon by alkalies it breaks up into piperate of the alkaline metal and the alkaloid piperidine, which has strong alkaloid properties.

Piperin occurs in black pepper and in the fruits of other plants of the same natural order—*Piperaceæ*.

Description and Tests.—See the Pharmacopœia, page 257.

Medicinal Uses.—Same as of black pepper.

Dose.—0.05 to 0.5 gram (1 to 8 grains).

Piscidia.

PISCIDIA.

Piscidiæ Radicis Cortex—Jamaica Dogwood.

Origin.—*Piscidia erythrina*, Linné (*Leguminosæ*).

Habitat.—West Indies.

Part used.—The bark of the root.

Description.—A tough, fibrous, blackish (internally greenish) bark, about five millimeters ($\frac{1}{5}$ inch) thick, of a heavy narcotic odor, reminding somewhat of opium, and a bitter, somewhat acrid, and astringent taste.

Constituents.—It contains a resinous (or resinoid) substance which has been named *piscidin.*

Properties.—Narcotic; used to relieve pain and to produce sleep.

Dose.—One to two grams (15 to 30 grains), preferably in the form of fluid extract.

PISCIDIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PISCIDIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every two hundred grams (about 6⅔ fluidounces) of water.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the *menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—One to two cubic centimeters (15 to 30 minims).

Pix Burgundica; U. S.

BURGUNDY PITCH.

Origin.—*Abies excelsa,* De Candolle (*Coniferæ*).

Habitat.—Southern Europe.

Description.—See the Pharmacopœia, page 257.

Constituents.—It is a resin with traces of volatile oil.

Medicinal Uses.—Employed in plasters.

PICIS BURGUNDICÆ EMPLASTRUM; U. S.

BURGUNDY PITCH PLASTER.

Melt together two hundred and seventy grams (9 ounces) Burgundy pitch and thirty grams (1 ounce) yellow wax, strain, and stir until cool.

In the old Pharmacopœia the proportions were twelve to one; the new preparation is of better consistence.

Uses.—Protecting and supporting; also slightly stimulating and counter-irritating in *chronic rheumatism,* etc.

Pix Canadensis; U. S.

CANADA PITCH.

Hemlock Pitch.

Origin.—*Abies canadensis*, Michaux (*Coniferæ*).

Habitat.—North America.

Description.—See the Pharmacopœia, page 258.

Constituents.—Resin, with traces of volatile oil.

Medicinal Uses.—Same as of Burgundy pitch.

PICIS CANADENSIS EMPLASTRUM; U. S.

CANADA PITCH PLASTER.

Hemlock Pitch Plaster.

Melt together two hundred and seventy grams (9 ounces) Canada pitch and thirty grams (1 ounce) yellow wax, strain, and stir until cool.

In the Pharmacopœia of 1870 the proportions were twelve to one. The new preparation is an improvement on the old.

Pix Liquida; U. S.

TAR.

Pini Pyroleum—*Theer*, G.; *Goudron*, *Goudron végétal*, F.; *Brea*, *Pez liquida*, Sp.; *Tjära*, Sw.

Origin.—*Pinus palustris*, Miller, and other species of *Pinus* (*Coniferæ*).

Habitat.—Europe and America.

Description.—See the Pharmacopœia, page 258.

North Carolina tar and Swedish tar are the best. Should be clear and free from mechanical impurities.

Constituents.—Oil of turpentine, pyrocatechin, acetic acid, creasote, phenol, etc., etc.

The granular appearance of tar is due to crystals of pyrocatechin, which is soluble in water, alcohol, and ether, and is very pungent.

Medicinal Uses.—Stimulant blennorrhetic in *catarrhal affections* of the mucous membranes of the bronchial tubes and of the urinary apparatus. Also employed externally in cutaneous affections, as *psoriasis*, *tinea capitis*, *scabies*, etc.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms) daily.

PIX LIQUIDA LOTA.

Washed Tar.

Macerate together in a suitable vessel one thousand grams (35 ounces) best North Carolina tar and two liters (68 fluidounces) cold distilled water for twenty-four hours, stirring frequently. Then let the mixture rest until the tar separates, after which pour off the water.

The object of this washing is the removal of acetic (pyroligneous) acid.

PICIS LIQUIDÆ GLYCERITUM.

Glycerite of Tar.

Mix one hundred grams (3 ounces 230 grains) washed tar with three hundred and sixty cubic centimeters (12 fluidounces) glycerin, three hundred cubic centimeters (10 fluidounces) alcohol, and one thousand cubic centimeters (34 fluidounces) water ; put it into a half-gallon flask. Heat it on a water-bath to about 80° C. (176° F.) for two hours, agitating the mixture frequently. Then pour it into a jar, let settle, decant, and filter.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

PICIS LIQUIDÆ INFUSUM.

Infusion of Tar.

Picis Aqua—Tar Water.

Shake one hundred grams (3 ounces 230 grains) purified tar in a half-gallon bottle with one thousand cubic centimeters (34 fluidounces) hot water until cold. Then set it aside to settle ; decant, and filter the decanted infusion.

The preparation is sherry-colored, clear ; has an acid reaction, and the odor and taste of tar , it contains the pyrocatechin of the tar together with acetic acid, methyl alcohol, creasote, etc.

Dose.—Two hundred and fifty to five hundred cubic centimeters ($\frac{1}{2}$ to 1 pint) daily.

PICIS LIQUIDÆ SYRUPUS ; U. S.

Syrup of Tar.

Wash sixty grams (2 ounces 50 grains) purified tar by agitating it with one hundred and twenty cubic centimeters (4 fluidounces) cold water for twenty-four hours. Decant and reject the washings. Upon

the washed tar pour five hundred cubic centimeters (17 fluidounces) boiling distilled water, stir briskly for fifteen minutes, and then set the mixture aside for thirty-six hours, stirring occasionally. Then let settle, decant, and filter. In four hundred grams (400 cubic centimeters, or about 13½ fluidounces) of the filtrate, dissolve six hundred grams (about 21 ounces) sugar, and filter the syrup.

Dose.—Ten cubic centimeters (2½ fluidrachms) or more.

PICIS LIQUIDÆ TINCTURA.

Tincture of Tar.

Dissolve two hundred grams (7 ounces 24 grains) purified tar in eight hundred cubic centimeters (27 fluidounces) alcohol. Filter, and add enough alcohol through the filter to make the total filtrate measure one thousand cubic centimeters (34 fluidounces).

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

PICIS LIQUIDÆ UNGUENTUM; U. S.

Tar Ointment.

Melt together sixty grams (or 2 ounces) suet and sixty grams (or 2 ounces) purified tar, strain the melted mixture through muslin, and stir it constantly until cold.

PICIS LIQUIDÆ VINUM.

Wine of Tar.

Digest together, for two hours, with frequent stirring, one hundred grams (3 ounces 230 grains) washed tar and one thousand cubic centimeters (34 fluidounces) sherry wine. Decant and filter.

Dose.—A teaspoonful.

PICIS LIQUOR KALINUS.

Alkaline Solution of Tar.

Macerate one hundred and fifty grams (5 ounces 127 grains) white caustic potassa and three hundred grams (10 ounces 255 grains) purified tar with one thousand cubic centimeters (34 fluidounces) water, for twenty-four hours, stirring frequently. Let it stand to settle, and then decant the clear solution from the sediment.

Used externally like tar.

Picis Liquidæ Oleum; U. S.

Oil of Tar.

This is the so-called "light oil of tar," a very mixed body, containing acetic acid, creasote, aceton, methyl alcohol, mesit, toluol, xylol, and cumol, besides probably other constituents. It is in no sense an oil; nor does it closely resemble the volatile oils, although described in the Pharmacopœia as "a volatile oil distilled from tar."

It is nearly colorless when freshly made, but after a short time turns reddish-brown. It has an acid reaction, and a strong odor and taste, reminding of its source.

When freed from acetic acid, methyl alcohol and creasote, and afterward subjected to fractional distillation, it yields a light, highly refractive liquid of 0.66 specific gravity, boiling at 47° to 52° C. (116° to 125° F.), and having an odor resembling that of chloroform. A distillate of 52° to 55° C. (125° to 131° F.) boiling-point has, after treatment with chlorine, an odor of oil of lemon. The distillate boiling at 57° to 60° C. (135° to 140° F.) has, after treatment with chlorine, the odor of raspberries. That boiling at 60° to 70° C. (140° to 158° F.) has an odor resembling that of leather; and that of 70° to 80° C. (158° to 176° F.) boiling-point smells like benzol.

Used for the same purposes as tar.

Pix Solida.

Black Pitch.

This is the solid residue remaining after the distillation of pine tar. It is frequently prepared by boiling tar in an open pot until the volatile substances have been driven off and the pitch remains, taking care not to continue the boiling longer than necessary to obtain a solid mass, which is brittle only in cold; this yields the best pitch.

It is black, opaque, melts at 98.5° C. (209.3° F.), is soluble in alcohol, ether, bisulphide of carbon, benzol, and in alkalies; it has the odor of tar; is nearly tasteless. Softens when chewed, but does not adhere to the teeth.

Coal-tar pitch, or *gas pitch*, is an entirely different thing.

Constituents.—Empyreumatic resins and some reten.

Uses.—Externally in plasters.

PICIS EMPLASTRUM.

Black Pitch Plaster.

Melt together ten grams (154 grains) Venice turpentine, twenty grams (308 grains) yellow wax, forty grams (1 ounce 180 grains) black

pitch, and sixty grams (2 ounces 50 grains) resin. Strain, and pour into oiled paper moulds so as to form cakes about one centimeter ($\frac{2}{5}$ inch) in thickness.

[PICIS] EMPLASTRUM OXYCROCEUM.

Make a plaster of thirty grams (1 ounce) yellow wax, fifteen grams ($\frac{1}{2}$ ounce) black pitch, fifteen grams ($\frac{1}{2}$ ounce) galbanum in powder, five grams (75 grains) Venice turpentine, five grams powdered myrrh, five grams powdered olibanum, and five grams powdered saffron.

Slightly stimulating and rubefacient.

Platinum.

PLATINUM.

One of the rarer metals. It is malleable, tough, and can be made into fine wire. Is not altered by exposure to air, nor attacked by any acid except nitromuriatic acid (*i.e.*, free or nascent chlorine).

Platinum foil and wire are used in testing, and weights of platinum are the best that can be made for chemical and pharmaceutical purposes, as they are readily cleaned without injury, and the metal is hard enough not to be appreciably abraded.

Plumbum.

LEAD.

Blei, G.; *Plomb*, F.; *Plomo*, Sp.; *Bly*, Sw.

Lead occurs chiefly as a sulphide, which is called *galena*. Pure lead has the specific gravity 11.3, and fuses at between 300° and 400° C. (617° F.).

Lead salts are white or yellow. The sulphate and carbonate are insoluble ; chloride and iodide but slightly soluble ; nitrate and acetate readily soluble in water.

Medicinal Uses.—Metallic lead in sheets has been used and recommended as an application to chronic inflamed ulcers, etc., but it is rarely employed except in the form of some of its salts.

Internally the salts of lead are sedative and astringent in medicinal doses, and externally they are used to combat inflammations.

Poisonous Effects.—In excessive doses the salts of lead may give rise to acute symptoms of poisoning, but the poisonous effects are more frequently in consequence of the gradual absorption of minute quantities of lead, and affect workers in that metal ; and especially those who are engaged in the manufacture of "white lead."

The symptoms of acute lead-poisoning are violent gastro-intestinal irritation, burning at the epigastrium, vomiting, with, perhaps, collapse and death.

The symptoms of chronic lead-poisoning are a blue line about the ridge of the gums, foul breath, severe spasmodic colic (*colica pictonum*) with chronic constipation, and occasionally paralysis generally limited to the extensors of the forearm, and giving rise to the symptom known as *drop-wrist.*

Antidotal Treatment.—In case of acute poisoning emetics should be freely given, followed by saline laxatives, especially magnesium sulphate in solution acidulated with dilute sulphuric acid, to form the comparatively insoluble sulphate of lead and prevent the absorption of the poisonous salt.

In chronic poisoning the main indication is to relieve the colic and constipation, both of which symptoms depend on the spasmodic contraction of the intestines, and can be best relieved by opium and small doses of laxatives. Magnesium sulphate is generally given, but proves useful not on account of its property of converting the poison in the stomach and bowels into an insoluble sulphate of lead, as it does in acute poisoning, but simply because it is a mild purgative. In chronic lead-poisoning the lead salts are in the system beyond the direct action of the magnesium sulphate, and, in fact, are often introduced by the inhalation of the dust or by absorption through the skin.

To eliminate lead salts from the system, sulphuretted baths, made by dissolving a few ounces of sulphide of potassium in a tub full of warm water, may be used. The patient is to use plenty of soap and a flesh-brush to facilitate the action of the sulphide on the skin. These baths are to be used daily until they cease to cause discoloration of the skin.

Iodide of potassium should be given internally.

Plumbi Acetas; U. S.

ACETATE OF LEAD.

Plumbicus Acetas—Lead Acetate; Plumbum Aceticum, Saccharum Saturni—Essigsaures Bleioxyd, Bleizucker, G.; *Acetate de plomb, Sel de Saturne, Sucre de Saturne,* F.; *Acetato plumbico, Sal de Saturno,* Sp.; *Ättiksyrad Blyoxid, Blysocker,* Sw.; *Sugar of Lead.*

Description and Tests.—See the Pharmacopœia, page 258.

Moist crystals effloresce more rapidly than a dry salt. The preparation must be kept in not too large dry bottles, well closed, and put in a cool place to prevent loss of water of crystallization.

A solution containing five per cent. of acetate of lead has the spe-

cific gravity 1.0319 ; one of ten per cent. strength, the specific gravity 1.0654 ; one of twenty per cent., 1.1384 ; thirty per cent., 1.2211 ; and forty per cent., 1.3163.

Medicinal Uses.—Sedative and powerfully astringent ; used in *hemorrhages* from the *bowels*, *lungs*, etc., and also in *excessive discharges*, as in *diarrhœa*, *dysentery*, and similar complaints. It is often combined with opium in the treatment of these cases.

Externally it is used in solution as an astringent and cooling application to counteract *inflammation*. Its external use may be followed by absorption and symptoms of poisoning.

Dose.—0.05 to 0.25 gram (1 to 4 grains), repeated every few hours if necessary.

PLUMBI ACETATIS ET OPII PILULÆ.

Pills of Acetate of Lead and Opium.

Mix three grams (45 grains) acetate of lead and 0.50 gram (7½ grains) powdered opium ; form a pill mass by adding minute quantities of powdered tragacanth and glycerin. Make fifteen pills.

Each pill contains twenty centigrams (3 grains) acetate of lead and three centigrams (½ grain) opium.

Dose.—One pill, repeated as necessary.

PLUMBI ACETATIS UNGUENTUM ; B.

Ointment of Acetate of Lead.

Mix thoroughly 2.50 grams (38 grains) acetate of lead with 97.50 grams (3 ounces 200 grains) benzoinated lard. The acetate of lead must first be reduced to very fine powder, and the benzoinated lard then added gradually.

Used as an application to inflamed surfaces or ulcers.

PLUMBI SUBACETATIS LIQUOR ; U. S.

Solution of Subacetate of Lead.

Plumbici Subacetatis Solutio—Solution of Lead Subacetate, Goulard's Extract ; Acetum Plumbicum, Acetum Saturni—Bleiessig, G.; *Extrait de Goulard, Vinaigre de plomb*, F.; *Blyättika*, Sw.

First dissolve one hundred and seventy grams (6 ounces) acetate of lead in eight hundred cubic centimeters (27 fluidounces) of boiling distilled water, in a porcelain evaporating dish ; then add one hundred and twenty grams (4 ounces 100 grains) oxide of lead, and boil together

for half an hour, adding hot water from time to time to make up for loss by evaporation. Let cool. Add enough distilled water, previously boiled and cooled (to expel air and carbonic acid), to make the whole weigh one thousand grams (35 ounces 120 grains).

Preservation.—Must be kept in quite filled and well-closed bottles.

Description and Strength.—A clear, colorless liquid (having a somewhat bluish fluorescence when in large bulk), of a sweetish, astringent taste, and an alkaline reaction. Specific gravity 1.228, corresponding to 27° Baumé. It contains about twenty-five per cent. of subacetate of lead, being a trifle weaker than the preparation of 1870.

It requires a thirteen- or fourteen-ounce bottle to hold a pound; one gallon of it weighs about ten pounds three and one-fourth ounces.

Used externally as an astringent and cooling lotion in *bruises*, *sprains*, etc. Soft cloths are dipped into a dilute mixture of this solution with soft water and applied to the affected parts.

PLUMBI SUBACETATIS LIQUOR DILUTUS; U. S.

Diluted Solution of Subacetate of Lead.

Bleiwasser, *Kühlwasser*, G.; *Eau de Saturne*, *Eau blanche*, F.; *Blyvatten*, Sw.; *Lead Water.*

Boil some distilled water and let it cool again. Mix nine hundred and seventy grams (33 fluidounces) of this water with thirty grams (1 ounce 25 grains) solution of subacetate of lead. Keep the mixture in well-corked bottles.

It contains three-fourths per cent. of subacetate of lead.

Used for the same purposes as the stronger solution, but requires no further dilution before being applied.

PLUMBI SUBACETATIS CERATUM; U. S.

Cerate of Subacetate of Lead.

Goulard's Cerate.

Mix thirty grams (1 ounce by weight, about 6½ fluidrachms) of solution of subacetate of lead with one hundred and twenty grams (4 ounces) of camphor cerate.

As cerate of subacetate of lead does not keep, the Pharmacopœia directs that it be freshly made when wanted.

The strength is about the same as in the previous pharmacopœias.

This application is cooling and astringent, and is a favorite ointment to heal old and indolent ulcers, especially when they are irritated and painful.

PLUMBI SUBACETATIS GLYCERITUM.

GLYCERITE OF SUBACETATE OF LEAD.

Boil together over an oil-bath fifty grams (1 ounce 334 grains) acetate of lead, thirty-five grams (1 ounce 103 grains) powdered and sifted oxide of lead, and two hundred cubic centimeters (5½ fluidounces) glycerin, stirring constantly, until the oxide of lead has all disappeared and a clear solution results.

The strength of this preparation is the same as that of solution of acetate of lead. It is a clear, colorless liquid.

This is miscible with distilled water in all proportions, yielding clear mixtures.

Used for the same purposes as solution of acetate of lead.

PLUMBI SUBACETATIS LINIMENTUM; U. S.

LINIMENT OF SUBACETATE OF LEAD.

Mix one hundred and twenty grams (4 ounces) solution of subacetate of lead with one hundred and eighty grams (6 ounces) cotton-seed oil—both by weight.

The preparation of this name in the Pharmacopœia of 1870 consisted of olive oil and solution of subacetate of lead in the same proportions as above.

Anodyne and cooling application in cases of *inflammation*, especially when the skin is involved, as in *chapped hands*, *bruises*, etc.

Plumbi Carbonas; U. S.

CARBONATE OF LEAD.

Plumbicus Carbonas—Lead Carbonate; Hydratocarbonas Plumbicus, Plumbum Carbonicum, Cerussa—Bleiweiss, G.; *Carbonate de plomb, Céruse, Blanc de plom*, F.; *Albayalde, Cerusa*, Sp.; *Blyhvitt, Blykarbonat*, Sw.; *White Lead.*

Description and Tests.—See the Pharmacopœia, page 259.

Under the microscope lead carbonate is seen to be crystalline. It should be of a perfectly pure white color, and consist of a fine powder, free from grittiness and from any mechanical impurities.

Medicinal Uses.—White lead is not used internally. Externally it is employed in *burns*, *scalds*, *ulcers*, *eczema*, *inflammations*, etc., either as a dry application or in the form of ointment. Its use may be followed by absorption and symptoms of poisoning.

PLUMBI CARBONATIS UNGUENTUM; U. S.

OINTMENT OF CARBONATE OF LEAD.

Unguentum Cerussæ.

Mix thoroughly ten grams (154 grains) carbonate of lead and ninety grams (3 ounces 76 grains) benzoinated lard.

Plumbi Iodidum; U. S.

IODIDE OF LEAD.

Plumbicum Iodidum—Lead Ioaide.

Description and Tests.—See the Pharmacopœia, page 259.

Must be *in fine powder.* A crystalline lead iodide looks very handsome, but is not suitable for medicinal uses.

Medicinal Uses.—Seldom employed internally. It is said to have proved useful as a discutient to cause the absorption of *scrofulous tumors* and *glandular swellings*, and as an application in *acne* and other *cutaneous diseases.*

Dose.—0.03 to 0.25 gram ($\frac{1}{2}$ to 4 grains).

PLUMBI IODIDI EMPLASTRUM.

PLASTER OF IODIDE OF LEAD.

Melt together four hundred and fifty grams (15 ounces 380 grains) soap plaster and four hundred and fifty grams resin plaster. Then incorporate thoroughly, while the plaster is still hot, one hundred grams (3 ounces 230 grains) iodide of lead, in fine powder.

PLUMBI IODIDI UNGUENTUM; U. S.

OINTMENT OF IODIDE OF LEAD.

Mix thoroughly ten grams (154 grains) iodide of lead, in fine powder, and ninety grams (3 ounces 76 grains) benzoinated lard.

Plumbi Nitras; U. S.

NITRATE OF LEAD.

Plumbicus Nitras—Lead Nitrate; Plumbum Nitricum—Bleisalpeter, Salpetersaures Bleioxyd, G.; *Azotate de plomb*, F.; *Nitrato plumbico*, Sp.; *Salpetersyrad Blyoxid*, Sw.

Description and Tests.—See the Pharmacopœia, page 259.

A very heavy white salt.

Medicinal Uses.—Seldom, if ever, given internally. Its solution is sometimes applied externally for the purpose of correcting the *fetid odor* of vaginal or other discharges, to cleanse *sloughing ulcers*, etc.

A solution of ten grains in an ounce of glycerin has been highly recommended as an application to *fissured nipples*.

Plumbi Oleatum.

Oleate of Lead.

Dissolve twenty grams (310 grains) powdered and sifted oxide of lead in eighty grams (2 ounces 360 grains) oleic acid, heated to 66° C. (150° F.), stirring constantly until complete union is effected.

It is a yellowish, soft ointment.

All the several lead plasters contain principally oleate of lead, and in addition palmitate of lead, besides other added ingredients.

PLUMBI EMPLASTRUM; U. S.

Lead Plaster.

Diachylon Plaster.

Triturate four hundred and eighty grams (16 ounces) of oxide of lead (powdered and sifted litharge) with four hundred and fifty grams (15 ounces) olive oil. Put the mixture into a dish capable of holding at least one gallon, and add four hundred and fifty grams (15 ounces) more of olive oil and one hundred and fifty grams (5 ounces) boiling water. Boil the whole together, stirring constantly, until a uniform plaster is formed. During the boiling add a little water from time to time to replace that consumed.

The Pharmacopœia requires that the lead plaster shall be "white, pliable, and tenacious, free from greasiness and stickiness." It will not fulfil these requirements unless it is thoroughly kneaded with water, and the latter afterward carefully squeezed out. When washed and kneaded in this way it will be a perfect lead plaster.

The product must be free from uncombined litharge.

The completion of the plaster is known by the change of the red color of the mixture to a grayish-white, and by taking out a sample and dropping it in cold water, when, if smooth and plastic, but not sticky between the fingers, it is ready.

The lead plaster sold by manufacturers is very frequently, if not generally, made with cotton-seed oil and lard oil in place of olive oil. The cotton-seed oil alone will not make the plaster, but by using lard oil with it the emplastrification is readily effected. Such plaster, however, is not as good as the genuine official lead plaster, and frequently

it has a very disagreeable odor, which is entirely absent in the true lead plaster.

Lead plaster is a mixture of oleate and palmitate of lead. When made with lard oil or lard, it also contains stearate of lead.

It is sometimes used to protect the skin from injury by the pressure or rubbing of splints or surgical apparatus, or to prevent bed-sores, or as an application to excoriated surfaces. It is mainly employed as a base for other plasters.

PLUMBI EMPLASTRUM COMPOSITUM HJÆRNERI.

Hjærne's Plaster.

Melt together seventy grams (2 ounces 200 grains) Castile soap and three hundred grams (10 ounces 250 grains) olive oil. Then add sixty grams (2 ounces 50 grains) carbonate of lead and one hundred and twenty grams (4 ounces 100 grains) red lead, previously well mixed and sifted, and then boil the mixture, with brisk and uninterrupted stirring, until the powder is all dissolved and the mass has acquired a dark chestnut-brown color. Then remove the plaster from the fire, add ten grams (154 grains) Venice turpentine, and mix well. When cool, roll the plaster into sticks about two centimeters ($\frac{4}{5}$ inch) in diameter.

Stimulating application to ulcers, etc.

[PLUMBI] EMPLASTRUM FUSCUM.

Brown Plaster.

Schwarzes Mutterpflaster.

Boil three hundred grams (10 ounces 250 grains) powdered and sifted oxide of lead with six hundred grams (21 ounces 70 grains) olive oil, stirring constantly, until the oxide is all dissolved and the mass assumes a dark brown color. Then remove the plaster from the fire and add to it while still hot one hundred and fifty grams (5 ounces 130 grains) yellow wax, and stir until the wax has melted and is thoroughly incorporated. Pour the plaster into tin or oiled-paper moulds, so as to obtain it in cakes of about one centimeter's ($\frac{2}{5}$ inch) thickness.

Used like the above.

[PLUMBI] EMPLASTRUM FUSCUM CAMPHORATUM.

Universal Plaster.

Melt one hundred grams (3 ounces 230 grains) brown plaster, and then incorporate with it five grams (77 grains) liniment of camphor.

This plaster is moulded into cakes like the brown plaster.

PLUMBI EMPLASTRUM MOLLE.

White Breast Plaster.

Melt together forty-two grams (1 ounce 210 grains) lead plaster, twenty-eight grams (430 grains) lard, fifteen grams (230 grains) suet, and fifteen grams yellow wax.

Pour it into paper moulds to form cakes of about one centimeter's thickness.

PLUMBI PETROLATUM.

Petroleum Cintment with Lead Plaster.

Melt together equal parts of lead plaster and petroleum ointment.

[PLUMBI] UNGUENTUM DIACHYLON; U. S.

Diachylon Ointment.

Melt together sixty grams (2 ounces 50 grains) lead plaster and thirty-nine grams (1 ounce 160 grains) olive oil, on a water-bath, and stir well. When partially cooled add to it one gram (15 grains) oil of lavender, and stir constantly until cold.

The preparation would be much improved by the omission of the volatile oil of lavender.

Used in *eczema* and other *skin diseases.*

PLUMBI UNGUENTUM HEBRÆ.

Hebra's Lead Ointment.

Melt one hundred grams (3 ounces 230 grains) lead plaster, and stir into it one hundred grams linseed oil.

Used like diachylon ointment.

PLUMBI UNGUENTUM BALSAMICUM.

Hebra's Balsamic Diachylon Ointment.

Mix one hundred and fifty cubic centimeters (5 fluidounces) olive oil and ninety cubic centimeters (3 fluidounces) water, in a capsule; add thirty-six grams (1 ounce 120 grains) powdered and sifted oxide of lead and stir the whole well together. Heat the mixture on a water-bath, stirring constantly, until all the oxide of lead has disappeared and emplastrification is perfected. Let cool. Then add ten grams (154 grains) balsam of Peru. Finally, add two hundred and thirty cubic centimeters (8 fluidounces) water, and incorporate well.

Sometimes three grams (46 grains) oil of lavender is added with the balsam of Peru.

PLUMBI UNGUENTUM NIGRUM.

BLACK PLASTER.

Melt together one hundred and thirty grams (4 ounces 250 grains) lard, one hundred and forty grams (4 ounces 410 grains) fresh, unsalted butter, one hundred and forty grams suet, one hundred and forty grams yellow wax, and two hundred and eighty grams (9 ounces 380 grains) olive oil. Heat the mixture until vapors begin to be emitted. Then add one hundred and forty grams (4 ounces 410 grains) powdered and sifted oxide of lead and boil the whole, stirring constantly, until all of the oxide is dissolved, and the melted mass has a dark brown color. Then remove the vessel from the fire, add to it, while still hot, thirty grams (1 ounce 25 grains) black pitch, and stir well until cool.

Plumbi Oxidum; U. S.

OXIDE OF LEAD.

Plumbicum Oxidum—Lead Oxide; Lithargyrum—Bleiglätte, G.; *Protoxide de plomb*, F.; *Litargirio*, Sp.; *Blyglete*, Sw.—*Litharge.*

Description and Tests.—See the Pharmacopœia, page 260.

Powdered litharge for use in making plaster must be perfectly pure and in fine powder.

It is not used internally, but is employed in the preparation of many plasters, ointments, lead salts, etc.

Plumbi Quercitannatis Glyceritum.

GLYCERITE OF OAK-TANNATE OF LEAD.

Boil one hundred and seventy-five grams (6 ounces 75 grains) coarsely ground oak bark for fifteen minutes with nineteen hundred cubic centimeters (4 pints) water, replacing the water lost by evaporation. Strain the decoction. Then add gradually solution of subacetate of lead so long as a precipitate continues to be formed. Collect the precipitate on a calico strainer, and wash it. Let drain, and press the drained tannate of lead between blotting-paper until a sufficient quantity of moisture has been removed from it to reduce its weight to sixty-five grams (2 ounces 130 grains). Mix this, while still moist, with thirty-five grams (1 ounce 100 grains) glycerin.

Uses.—Astringent and soothing application in *eczema*, *fissured nipples*, *bedsores*, etc.

Plumbi Superoxidum.

RED LEAD.

Minium—Superoxide of Lead, Red Oxide of Lead.

This, when pure, is Pb_3O_4. It is a heavy, scarlet-red, crystalline powder of the specific gravity 8.6 to 9.0, and contains 90.66 per cent. lead, the remainder being oxygen.

Not used medicinally.

Podophyllum; U. S.

PODOPHYLLUM.

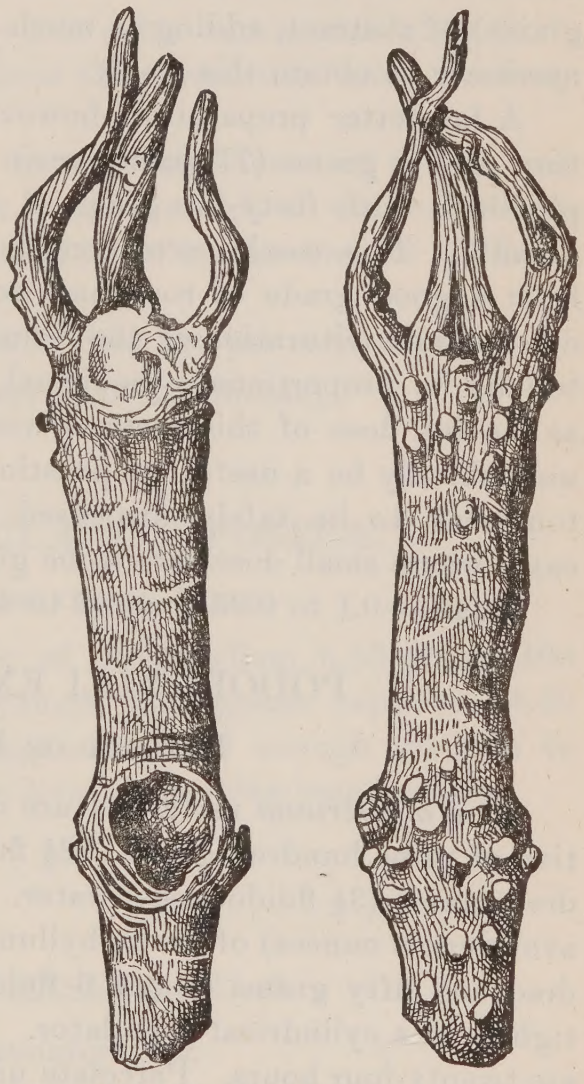
Podophylli Radix—Mandrake, May Apple.

Origin.—*Podophyllum peltatum*, Linné (*Berberidaceæ*).

Habitat.—North America.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 260. The rootlets are frequently entirely absent, having been broken off, leaving small white scars. The drug is quite variable in quality, its value depending directly upon the quantity of resin it yields.



FIGS. 426, 427.—Podophyllum, upper and under surface, natural size.

Constituents.—From four to five per cent. resin (called "podophyllin" in the trade). This resin is a mixture of podophyllinic acid, podophyllotoxin, picropodophyllin, and other matters. The presence of berberine in podophyllum has been announced and again denied.

Medicinal Uses.—Podophyllum is an emetico-cathartic in large doses. It also possesses alterative and cholagogue properties.

In medicinal doses it is a certain cathartic, producing profuse liquid discharges.

It is employed in *bilious fevers*, *hepatic congestions*, and whenever cathartics are indicated.

Dose.—0.3 to 2 grams (8 to 30 grains) of the powdered root.

PODOPHYLLI ABSTRACTUM; U. S.

Abstract of Podophyllum.

Preparation.—See the Pharmacopœia, page 6.

It could be equally well prepared, and with greater convenience, from the fluid extract, using one thousand cubic centimeters (34 fluidounces) of the fluid extract to obtain five hundred grams (17 ounces 280 grains) of abstract, adding as much powdered sugar of milk as may be necessary to obtain this result.

A far better preparation, however, would be a well-triturated mixture of five grams (77 grains) resin of podophyllum (so-called "podophyllin") with forty-five grams (1 ounce 257 grains) powdered sugar of milk. This would correspond in strength with an abstract prepared from a good grade of root, and would always be uniform. That the dilution and trituration of the resin in this manner increases very materially its proportionate medicinal activity is extremely probable, and as the full dose of this abstract would not exceed four grains, it would undoubtedly be a useful preparation, the dose of the resin itself being too small to be safely dispensed from the saddle-bag, especially in cases where small doses are to be given.

Dose.—0.1 to 0.25 gram (2 to 4 grains).

PODOPHYLLI EXTRACTUM; U. S.

Extract of Podophyllum.

As a *menstruum* use a mixture of alcohol and water in the proportion of three hundred grams (12½ fluidounces) alcohol to every one hundred grams (3⅓ fluidounces) water. Moisten five hundred grams (17⅔ avoirdupois ounces) of podophyllum, in No. 60 powder, with one hundred and fifty grams (about 6 fluidounces) of the menstruum. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate twenty-four hours. Percolate until two thousand five hundred grams (about 100 fluidounces) of percolate has been received. Distil off the alcohol, and evaporate the remainder to extract. No glycerin is added.

Brown.

Dose.—0.06 to 0.25 gram (1 to 4 grains).

PODOPHYLLI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Podophyllum.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

When made from prime drug it will yield five per cent. resin.

Dose.—0.5 to 1.5 cubic centimeter (8 to 20 minims).

PODOPHYLLI PILULÆ COMPOSITÆ.

Compound Podophyllum Pills.

Mix 1.60 gram (25 grains) resin of podophyllum, 6.50 grams (100 grains) alcoholic extract of hyoscyamus, 6.50 grams capsicum, 6.50 grams sugar of milk, 1.60 gram tragacanth, and enough glycerin to make a suitable mass, which is to be divided into one hundred pills.

Dose.—One to two pills.

PODOPHYLLI RESINA; U. S.

Resin of Podophyllum.

"*Podophyllin.*"

Preparation.—See the Pharmacopœia, page 281.

When properly made the resin of podophyllum well represents the activity of the drug. It has a dirty yellowish-green color and a peculiar odor.

We have seen specimens of this preparation colored yellow with powdered gamboge, and consisting largely of the powdered root. "Podophyllin" consisting of dried and powdered extract is also to be found in the market.

Dose.—0.01 to 0.03 gram (⅙ to ½ grain).

Polygonatum.

SOLOMON'S SEAL.

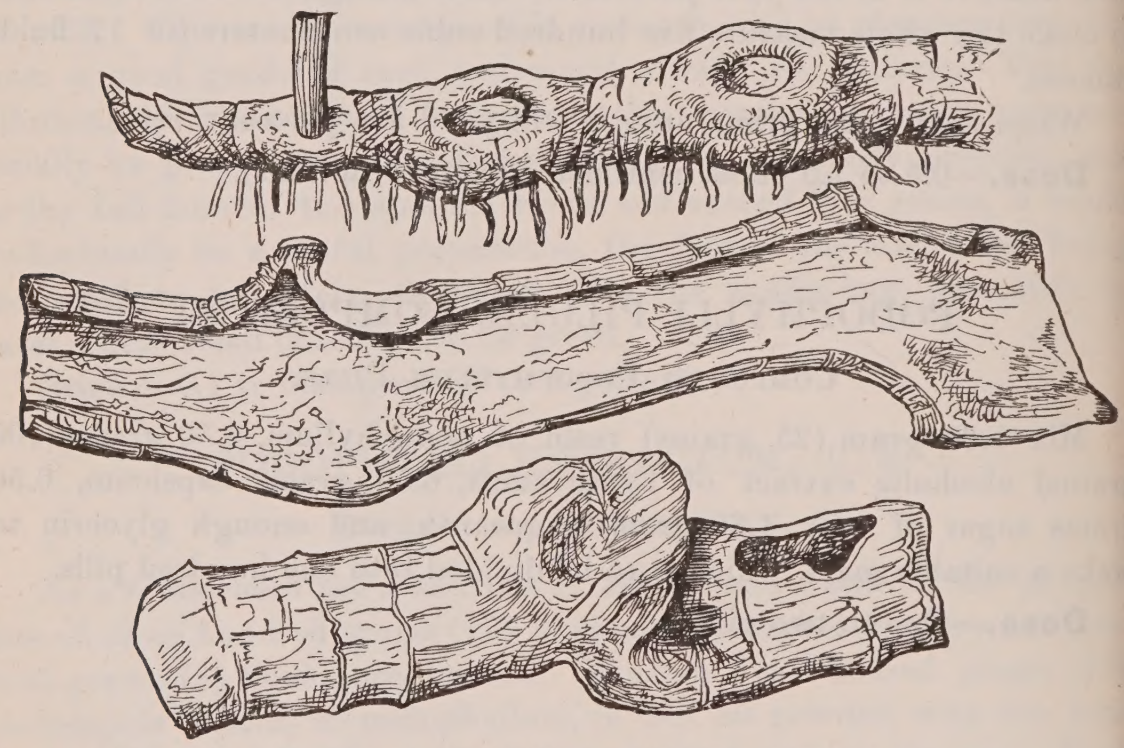
Polygonati Radix.

Origin.—*Polygonatum giganteum*, Dietrich ; and *P. biflorum*, Ell. (*Liliaceæ*).

Habitat.—The United States.

Parts used.—The rhizomes.

Description.—Brownish-yellow, about fifteen centimeters (6 inches) long, jointed, each joint being marked by a stem-scar ; whitish and spongy within. Odor, none ; taste, bitter, acrid. Usually sliced longitudinally in the drug.



FIGS. 428, 429.—Polygonatum, whole, fresh, reduced ; sliced as in drug.

Constituents.—A bitter, acrid principle called *convallarin*, which is crystallizable, soluble in alcohol, slightly soluble in water, the aqueous solution foaming like a solution of saponin.

Uses.—Tonic, mucilaginous, and slightly astringent. Said to exert a special influence on relaxed mucous membranes. Used in diseases of females, as *leucorrhœa*, *menorrhagia*, etc. Also used internally and externally in *piles*.

Said to have been used with good effect in *rheumatism*, *gout*, and *dropsy*, and externally as an application to remove *freckles* and for relieving *sprains*, *bruises*, and *local inflammations*.

Dose.—One to two grams (15 to 30 grains), preferably in the form of fluid extract.

POLYGONATI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF POLYGONATUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—One to two cubic centimeters (15 to 30 minims).

Polymnia.

POLYMNIA.

Polymniæ Radix—Bearsfoot.

Origin.—*Polymnia uvedalia*, Linné (*Compositæ*).

Habitat.—The United States, from Illinois to Florida.

Part used.—The root.

Description.—From fifteen to thirty centimeters (6 to 12 inches) long, and about eight millimeters (⅓ inch) in diameter at the large end, somewhat flattened in drying, brownish, wrinkled lengthwise, whitish or greenish-white within. Odor, when broken, disagreeable; taste bitter, acrid.

Constituents.—Two resins; one brittle, the other soft; both acrid.

Uses.—In *rheumatism*, *enlargement of the spleen* and *liver*, *white swelling*, etc. It is also used externally in the form of ointment in *glandular tumors*, *abscesses*, and *swellings*.

For internal administration the fluid extract should be preferred.

Dose.—0.25 to 0.50 gram (4 to 8 grains).

POLYMNIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF POLYMNIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.20 to 0.50 cubic centimeter (3 to 8 minims).

POLYMNIÆ UNGUENTUM.

OINTMENT OF POLYMNIA.

Heat two hundred grams (7 ounces 24 grains) fresh polymnia, finely cut, with four hundred grams (14 ounces 48 grains) lard on a water-bath until water ceases to evaporate. Strain. Light greenish, and has the disagreeable odor of the root.

Polypodium.

POLYPODIUM.

Polypodii Rhizoma.

Origin.—*Polypodium vulgare*, Linné (*Polypodiaceæ*).

Habitat.—Northern Europe.

Description.—See the figure. It is dark brown externally, interiorly brownish-yellow. Odor none; taste sweetish, reminding of liquorice root.

FIG. 430.—Polypodium Vulgare, natural size.

Constituents.—No analysis. It probably contains gum and a saccharine substance, or a glucoside resembling glycyrrhizin.

Medicinal Uses.—Said to be demulcent, laxative, and anthelmintic. A strong decoction may be used for the expulsion of tapeworm.

Dose.—Four to fifteen grams (60 to 240 grains), in powder or decoction.

Populus.

POPULUS.

Populi Cortex — White Poplar Bark, American Aspen.

Origin.—*Populus tremuloides*, Michaux (*Salicaceæ*).

Habitat.—The United States.

Part used.—The bark.

Description.—Quills, or troughs, externally grayish-white, rough, transversely fissured, on the inner side nearly smooth, light yellowish-brown. Odor slight; taste bitter.

Constituents.—*Populin*, a bitter principle, which has been obtained in white needle-like crystals. Also tannin. Populin is antiseptic.

Medicinal Uses.—It is a bitter tonic and antiperiodic, and has been used successfully in *intermittent fevers.*

Dose.—Two to five grams (30 to 75 grains), several times a day, best given in the form of fluid extract.

POPULI DECOCTUM.

DECOCTION OF POPULUS.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms).

POPULI EXTRACTUM.

EXTRACT OF POPLAR BARK.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

POPULI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF POPLAR BARK.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Populi Gemmæ.

POPLAR BUDS.

The terminal buds of the poplar, containing volatile oil and resin, and possessing a balsamic odor, are used in preparing ointments,

to preserve the fats from getting rancid, and to impart a fragrant odor.

They also possess the medicinal properties of other terebinthinate substances.

POPULI UNGUENTUM.

OINTMENT OF POPLAR BUDS.

Digest one thousand grams (35 ounces 120 grains) lard with five hundred grams (17 ounces 275 grains) fresh bruised poplar buds, keeping the mixture gently boiling until all moisture is dissipated, and then straining.

It is a fragrant ointment, resembling benzoinated lard in keeping qualities.

Potassium.

POTASSIUM.

Kalium.

Salts of potassium are absorbed from the earth by plants, and the ash of plants contains potassium carbonate in considerable quantity. This is the principal material from which potassium salts are prepared. The acid tartrate of potassium deposited from wine (called *argols*) is another important substance from which potassium salts are made.

The metal is made by heating at white heat a mixture of potassium carbonate and carbon in an iron retort specially constructed for that purpose. It is silver-white, soft, malleable, and when freshly cut is lustrous. It melts at 62.5° C. (144° F.). When exposed to the air it rapidly oxidizes. It also decomposes water, taking the oxygen from it, the reaction being energetic, and the heat generated sufficient to ignite the hydrogen. Potassium is therefore necessarily kept in distilled petroleum (which contains no oxygen). In the trade we accordingly find it put up in small glass-stoppered bottles containing petroleum, in which the pieces of potassium, considerably tarnished on the surface, are submerged.

The salts of potassium are colorless or white, frequently anhydrous, and generally readily soluble in water. The carbonate and several other potassium salts are deliquescent.

For saturation table of potassium salts, see the Pharmacopœia, page 434 ; also pages 431 and 432.

Potassa ; U. S.

POTASSA.

Potassicus Hydras—Potassium Hydrate ; Potassa Caustica, Kali Causticum, Oxidum Potassicum—Aetzkali, G.; *Potasse caustique*, F.; *Potasa caustica*, Sp.; *Kali, Kalihydrat*, Sw.; *Caustic Potassa.*

Description and Tests.—See the Pharmacopœia, pages 260–261. Must be quite white, hard, and dry.

For respective specific gravities of solutions of various strengths, see the Pharmacopœia, page 424. For saturation tables, see pages 431 and 432.

Must be kept in bottles of hard glass (common green or amber bottle glass is better than flint glass), as it attacks softer glass.

The glass stoppers in bottles containing potassa frequently become fast in the neck so as not to be removable. To prevent this a little petrolatum may be rubbed on the stopper before inserting it.

Medicinal Uses.—This substance is powerfully escharotic, depriving the tissues with which it comes in contact of water, and thereby destroying their vitality. Its action is not limited to the superficial tissues, but is penetrating, and therefore of value in cauterizing *bites of animals* or *stings of insects*, or in destroying *chancres* and *malignant pustules.* Any excess, after the necessary cauterization has been effected, may be washed away with water or neutralized with dilute vinegar. The superficial extent of its action may be determined by applying a piece of adhesive plaster into which an opening has been cut to expose the required surface of the skin.

Potassa is also used to form issues or open deep-seated *abscesses*, as *abscess of the liver.* The irritation and inflammation surrounding the destroyed tissues in such a case causes the uniting of the peritoneum, and thereby prevents the escape of pus into the peritoneal cavity.

It is also used to destroy *nævi, warts*, etc.

For its internal uses see "Potassæ Liquor."

POTASSA CUM CALCE ; U. S.

POTASSA WITH LIME.

Vienna Paste.

Powder and triturate together, in a warm mortar, equal parts by weight of potassa and unslaked lime.

Keep the mixture in bottles lightly corked with paraffined corks.

Less caustic than potassa but retains its caustic qualities longer, as

the lime present absorbs all the carbonic acid which may have access to the preparation, keeping the potassa free from potassium carbonate.

It is a milder and more manageable caustic than pure potassa, and is used in the same way and for the same purposes.

POTASSÆ LIQUOR; U. S.

SOLUTION OF POTASSA.

Potassici Hydratis Solutio—Solution of Potassic Hydrate; Solutio Hydratis Kalici, Liquor Kali Caustici—Aetzkalilauge, Kalilauge, G.; *Potasse caustique liquide, Levisse caustique*, F.; *Solucion de Potassa Caustica, Lejia de Potasa*, Sp.; *Kalilut*, Sw.

Dissolve ninety grams (3 ounces 76 grains) potassium bicarbonate in four hundred cubic centimeters (13½ fluidounces) distilled water. Heat the solution until effervescence ceases, and then bring the liquid to the boiling-point.

Slake forty grams (1 ounce 180 grains) lime and rub it into a smooth paste with four hundred cubic centimeters (13½ fluidounces) of distilled water, and heat it to boiling. Then pour the solution of bicarbonate of potassium gradually into the milk of lime and boil the mixture ten minutes. Take the vessel from the heat and cover it tightly. When cold add enough distilled water to make the whole weigh one thousand grams (35 ounces 120 grains). Finally strain through bleached linen, or let the solution settle well, and then syphon off or decant the clear.

Solution of potassium hydrate may also be made by dissolving fifty-six grams (1 ounce 426 grains) potassa (pure white caustic potassa in sticks) in nine hundred and forty-four cubic centimeters (32 fluidounces) of distilled water. Filter through a double *white* filter.

Preservation.—Must be kept in bottles with glass stoppers greased with a little petrolatum, or corked with corks dipped in melted paraffin.

Description and Strength.—Clear, colorless, odorless, acrid, caustic, strongly alkaline. Specific gravity 1.036, corresponding to 5.2° Baumé. Contains five per cent. potassium hydrate.

It is difficult to make any comparison as to strength between this solution of potassa and that of 1870, as the Pharmacopœia of 1870 makes two statements as to its strength which cannot be reconciled. If the liquor potassæ of 1870 had a specific gravity of 1.065, as stated, then it should contain over eight per cent. of the hydrate of potassium, instead of 5.8 per cent.; on the other hand, if, as stated in the Pharmacopœia, it contained 5.8 per cent. potassium hydrate, its specific gravity must have been about 1.058 instead of 1.065.

For table of specific gravities of solutions of potassa, see the Pharmacopœia, page 424.

Used internally it possesses the properties of a free alkali, neutralizing *excess of acid* in the blood and secretions, rendering the urine alkaline, and thus acting as an antilithic in cases of *acid urinary concretions.*

It is given occasionally in *heartburn*, *rheumatism*, etc., but other substances produce the same effects and are more pleasant to the taste, so that this solution is seldom employed except for making other pharmaceutical preparations.

Dose.—0.5 to 4 cubic centimeters (10 to 60 minims), largely diluted with water. The alkaline taste is best improved by syrups.

LIQUOR KALI CAUSTICI.

THIRTY-THREE PER CENT. SOLUTION OF POTASSA.

The formerly official German Pharmacopœial solution of potassa has a specific gravity of 1.330 to 1.334, and contains one-third its weight (33⅓ per cent.) potassium hydrate. Pharmacists sometimes have occasion to use it. It may be made in the same manner as the liquor potassæ of our Pharmacopœia (1880), using six hundred grams (21 ounces 72 grains) instead of ninety grams of bicarbonate of potassium, and two hundred and seventy grams (9 ounces 230 grains) instead of forty grams of lime. It will be necessary in this case, however, to use three times as much water, and to finally evaporate the product down to one thousand grams (35 ounces 120 grains).

It may also be made by dissolving three hundred and seventy grams (about 13 ounces) potassa in sticks in six hundred and thirty grams (21.3 fluidounces) of distilled water.

Used only for pharmaceutical purposes.

Potassa Sulphurata; U. S.

SULPHURATED POTASSA.

Potassii Sulphidum, Potassii Sulphuretum, Hepar Sulphuris, Kalium Sulphuratum—Kalischwefelleber, G.; *Foie de soufre*, F.; *Higado de Azufre*, Sp.; *Svafvellefver*, Sw.; *Liver of Sulphur.*

A mixture of sulphide (tri-sulphide) of potassium, together with small quantities of hyposulphite and sulphate of potassium.

For preparation, description, and tests, see the Pharmacopœia, page 261.

Medicinal Uses.—It has been given internally in *rheumatism*,

gout, and *cutaneous diseases*. It does not appear to be of any great value when thus given, and is rarely administered.

Externally, in solution or ointment, it has been used with benefit in *cutaneous diseases*, *itch*, and as a bath in *chronic saturnine poisoning* to eliminate the lead.

Dose.—0.1 to 0.5 gram (2 to 8 grains), best given in syrup flavored with oil of anise, or in pill.

POTASSÆ SULPHURATÆ UNGUENTUM.

OINTMENT OF SULPHURATED POTASSA.

Mix intimately five grams (77 grains) sulphurated potassa and ninety-five grams (3 ounces 140 grains) lard.

Potassii Acetas; U. S.

ACETATE OF POTASSIUM.

Potassicus Acetas—Potassium Acetate; Kalium Aceticum.

Description and Tests.—See the Pharmacopœia, page 262.

Must be perfectly white and free from any odor, except a faint rather agreeable odor of pure acetic acid. Should be dry, so as to be a somewhat mobile granular powder, and must be entirely soluble in less than one-half its own weight of water and in twice its weight of proof spirit.

Solution for Dispensing Purposes.—Dissolve two hundred grams (about 7 ounces avoirdupois) acetate of potassium in enough distilled water to make the finished solution measure two hundred cubic centimeters (6¾ U. S. fluidounces). Filter.

Each cubic centimeter of the solution contains one gram of the salt; one hundred and five minims contain one hundred grains.

Does not keep long, and hence must be frequently renewed. After standing a short time it contains carbonate, and when standing long it moulds.

Medicinal Uses.—Acetate of potassium is a diuretic; it should be given largely diluted with water, and serves as a *directive* to the latter, determining its elimination by the kidney. It is most useful in those cases of insufficient diuresis caused by diseases of the kidney following *scarlatina*. It is not of much value for the removal of dropsical accumulations in the various cavities of the body.

Dose.—0.5 to 1.5 gram (8 to 20 grains).

Potassii Bicarbonas ; U. S.

BICARBONATE OF POTASSIUM.

Potassicus Bicarbonas—Potassium Bicarbonate ; Kali Bicarbonicum, Bicarbonas Kalicus—Doppelt-kohlensaures Kali, G. ; *Bicarbonate de Potasse*, F. ; *Bicarbonato de potasa*, Sp. ; *Tvåfaldt kolsyradt kali*, Sw. ; *Bicarbonate of Potash.*

Description and Tests.—See the Pharmacopœia, page 262.

Must be kept in tightly closed bottles. When containing much carbonate of potassium (two per cent. or more), the crystals are moist and have a very alkaline taste. The preparation should dissolve without any residue in four times its weight of cold water. The crystals must be clear and colorless.

An aqueous solution of potassium bicarbonate gives off carbonic acid, even at ordinary temperatures. At above 80° C. (176° F.) the solution effervesces, and normal carbonate is found.

Medicinal Uses.—Same as of potassæ liquor, but it is more pleasant to the taste. Antacid, diuretic, and antilithic.

Dose.—One to four grams (15 to 60 grains).

Potassii Bichromas ; U. S.

BICHROMATE OF POTASSIUM.

Potassicus Bichromas—Potassium Bichromate ; Kali bichromicum.

Description and Tests.—See the Pharmacopœia, page 263.

Bichromate of potassium is poisonous. Its dust is very irritating to the mucous membrane of the nose.

Medicinal Uses.—Has been employed in *secondary syphilis.* Not used internally at present. A saturated solution is sometimes used as an escharotic application to *syphilitic warts* and *excrescences, foul ulcers*, etc. It is a violent irritant poison in overdoses, causing gastro-intestinal irritation. Its effects must be counteracted by soap, magnesia or alkaline carbonates, demulcents, opiates, etc.

Dose.—About 0.01 gram ($\frac{1}{6}$ grain).

Battery Fluid.—Pour two liters (68 fluidounces) water into a two-gallon porcelain evaporating dish ; stir it in one direction until set in rapid rotatory motion ; then pour one liter (34 fluidounces) commercial concentrated sulphuric acid into the center of the water in a small stream. When the mixture has cooled, add four hundred grams (14 ounces 48 grains) potassium bichromate ; stir the whole a few minutes.

Then add four liters (136 fluidounces) water, and when the whole liquid has become cold add six hundred and twenty cubic centimeters (21 fluidounces) more of commercial concentrated sulphuric acid.

Potassii Bitartras; U. S.

BITARTRATE OF POTASSIUM.

Potassicus Bitartras—Potassium Bitartrate; Kali bitartaricum, Tartarus depuratus, Cremor Tartari—Weinstein, G.; *Bitartrate de potasse, Crème de tartre, Pierre de vin*, F.; *Cremor Tartaro*, Sp.; *Cremor Tartari, Tvåfaldt vinsyradt kali, Renad vinsten*, Sw.; *Cream of Tartar.*

Description and Tests.—See the Pharmacopœia, page 263.

Crystals are not used in dispensing pharmacy, and hence the pharmacopœial description might omit the reference to that form.

Medicinal Uses.—Refrigerant aperient or cathartic, and diuretic. Useful in diluted solutions as a cooling drink in *fevers*, or in larger doses and less diluted form as a hydragogue cathartic to remove *dropsical accumulations.* It is generally used in combination with other remedies, as senna, sulphur, jalap, etc.

Dose.—Four to ten grams (60 to 150 grains) as an aperient; fifteen to thirty grams ($\frac{1}{2}$ to 1 ounce) as a cathartic.

"*Imperial Drink.*"—Dissolve ten grams ($\frac{1}{3}$ avoirdupois ounce) cream of tartar and thirty grams (1 ounce) sugar in one liter (34 fluidounces) of water.

Dose.—*Ad libitum.*

Potassii Boro-tartras.

BORAX TARTAR.

Potassicus Tartras Boraxatus, Tartarus Boraxatus—Boro-tartrate of Potassium.

Dissolve one hundred grams (3 ounces 230 grains) powdered borax in one thousand cubic centimeters (34 fluidounces) boiling water, and add to the solution, while still hot, two hundred grams (7 ounces 24 grains) powdered bitartrate of potassium and stir until all is dissolved. Evaporate the solution on a water-bath until a small portion of it, when removed from the dish, hardens on cooling. Then remove the dish from the water-bath, allow the contents to become semi-solid, and then pull it (like taffy) into sticks, and dry these on glass plates at a temperature not exceeding 80° C. (176° F.), and powder.

Must be kept in tightly corked bottles, as it is very hygroscopic.

It is a white powder, odorless, with an acid saline taste, and acid reaction. It is soluble in its own weight of cold water, and in half its weight of warm water.

Uses similar to those of cream of tartar, in similar doses.

Potassii Bromidum; U. S.

BROMIDE OF POTASSIUM.

Potassicum Bromidum—Potassium Bromide; Kalium Bromatum—Bromkalium, G. and Sw.; *Bromure de potassium*, F.; *Bromuro potasico*, Sp.

Description and Tests.—See the Pharmacopœia, pages 263 and 264.

Small crystals are to be preferred to large ones. In ascertaining the reaction of the salt, use a solution, as the moistened crystals may give an alkaline reaction when a solution shows the salt to be in fact neutral.

Medicinal Uses.—Bromide of potassium is a depressant, reducing the heart's action, and producing general relaxation; in large doses it may produce death. Its effects on the nervous system are not perfectly understood, but it allays irritation, especially when due to reflex action and not accompanied by inflammation. It also contracts the capillaries, and reduces the quantity of blood in the brain, on which account it is useful in certain forms of *headache* and *insomnia*.

It is much employed in *epilepsy*, in which disease its use must be persevered in for months, and often for years. It is also used in *spasms*, *delirium tremens*, *general nervous excitement*, and as an anaphrodisiac in all forms of *genital irritation*, *painful erections*, *nymphomania*, *excessive sexual passion*, or to allay irritation of the urethra during the introduction of a catheter.

As antidote in *strychnine-poisoning* it is of much value, and it is frequently given either with or after full doses of quinine to prevent the effects of the latter drug on the hearing.

A full dose of this remedy is also occasionally given to render the fauces less irritable during examination with the laryngoscope.

Dose.—One to eight grams (15 to 120 grains) if largely diluted with water, and repeated several times a day if necessary.

Solution for Dispensing Purposes.—Dissolve two hundred grams (7 ounces 24 grains) of the potassium bromide in enough distilled water to make the finished solution measure eight hundred cubic centimeters (27 fluidounces). Filter.

Each cubic centimeter of the solution contains one-fourth gram (25 centigrams) of the salt ; one hundred and five minims contain twenty-five grains.

Potassii Carbonas ; U. S.

CARBONATE OF POTASSIUM.

Potassicus Carbonas—Potassium Carbonate ; Kali Carbonicum, Carbonas Kalicus—Kohlensaures Kali, G.; *Carbonate de potasse*, F.; *Carbonato potasico*, Sp.; *Kolsyradt Kali, Renad Pottaska*, Sw.

Description and Tests.—See the Pharmacopœia, page 264.

The carbonate of potassium of the Pharmacopœia is a nearly chemically pure salt.

When the salt is dissolved in water, heat is generated.

Must be perfectly white, dry, and stand the pharmacopœial tests.

Uses.—Similar to those of the bicarbonate of potassium, but it is rarely employed internally.

Externally it is employed, in solution or ointment, in *itch* and other *skin affections.*

It is often sold under the name "*shampoo*," its dilute solution in soft water, together with soap, being used in *shampooing* or washing the hair. Its oft-repeated use, or its use in too strong solution, is injurious to the hair.

Dose.—For internal use, about one gram (15 grains), largely diluted.

Potassii Chloras ; U. S.

CHLORATE OF POTASSIUM.

Potassicus Chloras—Potassium Chlorate ; Kali Chloricum, Kali Oxymuriaticum—Chlorsaures Kali, G.; *Chlorate de potasse*, F.; *Clorato Potasico*, Sp.; *Klorsyradt Kali*, Sw.; *Chlorate of Potash.*

Description and Tests.—See the Pharmacopœia, page 265.

Commercial chlorate of potassium generally fails to withstand the tests prescribed by the Pharmacopœia, and requires to be re-crystallized or granulated.

A saturated solution of potassium chlorate at ordinary temperatures may be made by dissolving sixty grams (2 ounces 50 grains) in one thousand cubic centimeters (34 fluidounces) boiling water, and allowing the solution to become cold. (1 avoirdupois ounce to 1 pint is about the same proportion.)

Chlorate of potassium is explosive when triturated or subjected to pressure or blows, especially when mixed with some substance which readily combines with oxygen. It is, therefore, a dangerous proceed-

ing to triturate or mix chlorate of potassium in a mortar with sulphur, tannin, sugar, charcoal, and numerous other substances. To triturate chlorate of potassium by itself in a mortar is also dangerous, even if the mortar and pestle are perfectly clean, for the least percussion might cause explosion. Chlorate of potassium and glycerin should never be triturated together, except when water or some other diluent is added.

Medicinal Uses.—This remedy is much used, and often abused, in all forms of throat affections. In some forms of *stomatitis* or *pharyngitis* it is of good service. It is also useful in *salivation* following the administration of mercury. In excessive doses it may prove an irritant poison.

Formerly it was given in cases of imperfect aëration of the blood, under the erroneous impression that it imparted its oxygen to the blood. It passes through the system and is eliminated with the urine unchanged.

Dose.—0.5 to 1 gram (8 to 15 grains), every three or four hours.

Solution for Dispensing Purposes.—Dissolve fifty grams (1 ounce 334 grains avoirdupois) of the potassium chlorate in enough boiling distilled water to make the finished solution measure one liter (or very nearly 34 fluidounces). Filter.

Each cubic centimeter of the solution contains 0.05 gram (5 centigrams) of the salt; twenty-one minims contains one grain.

POTASSII CHLORATIS TROCHISCI; U. S.

Troches of Chlorate of Potassium.

Mix by trituration one hundred and twenty-four grams (1,900 grains) finely powdered sugar, 6.50 grams (100 grains) powdered tragacanth, and 0.65 gram (10 grains) spirit of lemon. Then put the powder on a sheet of clean paper and mix with it, by means of a horn spatula, 32.50 grams (500 grains) finely powdered chlorate of potassium, "being careful to avoid trituration and pressure, to prevent the mixture from igniting or exploding." Then put the mixed powder back in the mortar, add enough water, and form a mass. Divide it into one hundred troches.

Potassii Chromas.

Chromate of Potassium.

A lemon-yellow salt, in small crystals, readily soluble in water. Reaction alkaline. Prepared by adding potassium carbonate to a solution of potassium bichromate as long as it causes effervescence.

Not used in medicine. Employed for the preparation of the bichromate of potassium.

Potassii Citras; U. S.

Citrate of Potassium.

Potassicus Citras—Potassium Citrate.

Description and Tests.—See the Pharmacopœia, page 265.

Medicinal Uses.—Refrigerant, diuretic, and diaphoretic. Also used as an alkaline to affect the constitution. Best given in the form of the solution.

Dose.—One to two grams (15 to 30 grains).

POTASSII CITRATIS LIQUOR; U. S.

Solution of Citrate of Potassium.

Potassici Citratis Solutio; Solution of Potassium Citrate.

Dissolve sixty grams (2 ounces) citric acid in four hundred grams (13½ fluidounces) of distilled water. Filter the solution and add enough distilled water through the filter to make the total filtrate weigh five hundred grams (or measure 16 fluidounces).

Dissolve eighty grams (2⅔ ounces) bicarbonate of potassium also in four hundred grams distilled water, filter, and make up the weight by the addition of water through the filter to five hundred grams. Mix the two liquids, and when the evolution of carbonic acid gas has ceased, put the preparation in a bottle and cork well. Must be freshly made when wanted for use.

It has a specific gravity of 1.059 and contains about nine per cent. of potassium, citrate, together with a little free citric acid and some carbonic acid held in solution.

The freshly mixed and effervescing solution also relieves *nausea* and *vomiting*, on account of the carbonic acid which is liberated.

Dose.—Thirty cubic centimeters (1 fluidounce) of the solution, preferably given by mixing fifteen cubic centimeters (½ fluidounce) of each of the two solutions and drinking while effervescing.

POTASSII CITRATIS MISTURA; U. S.

Mixture of Potassium Citrate.

Neutral Mixture.

Add bicarbonate of potassium in clear crystals gradually to fresh lemon-juice until the liquid becomes neutral to litmus paper. Must be freshly made whenever wanted for use.

Fresh lemon-juice contains about seven per cent. citric acid, and it

requires about three grams (46 grains) of the crystals of bicarbonate of potassium to neutralize thirty cubic centimeters (1 fluidounce) of the juice. It is best, however, to add until neutralization is effected.

Used like the last.

Dose.—About fifteen cubic centimeters ($\frac{1}{2}$ fluidounce), diluted.

Potassii Cyanidum; U. S.

CYANIDE OF POTASSIUM.

Potassicum Cyanidum—Potassium Cyanide; Cyankalium, G. and Sw.; *Cyanure de potassium*, F.; *Cianuro potasico*, Sp.

Description and Tests.—See the Pharmacopœia, page 266.

Must be quite white and dry. Being deliquescent it must be kept in tightly corked bottles.

Medicinal Uses.—Similar to those of hydrocyanic acid, but this remedy is seldom used internally. It is extremely poisonous. It is much used in photography and in cleaning silver-ware, and great care must be taken in its use, as it may be absorbed through the skin and produce its toxic effects.

Dose.—0.008 gram ($\frac{1}{8}$ grain), dissolved in water. The hydrocyanic acid may be liberated by dispensing in a solution containing syrup of citric acid.

Potassii et Sodii Tartras; U. S.

TARTRATE OF POTASSIUM AND SODIUM.

Potassico-Sodicus Tartras—Potassium-Sodium Tartrate; Natro-kali Tartaricum, Sal Seignetti—Seignettesalz, G.; *Sel de Seignette*, F.; *Tartrato sodico potasico*, Sp.; *Vinsyradt natron-kali*, Sw.; *Rochelle Salt.*

Description and Tests.—See the Pharmacopœia, page 266.

Very generally used. It was discovered by Pierre Seignette, an apothecary in Rochelle, France, and is called Seignette salt in Germany and France, and Rochelle salt in England and America.

Medicinal Uses.—Pleasant refrigerant laxative; useful in *fevers*, etc.

Dose.—Eight to thirty grams ($\frac{1}{4}$ to 1 ounce), in solution flavored according to taste.

Potassii Ferricyanidum.

FERRICYANIDE OF POTASSIUM.

Potassicum Ferricyanidum—Potassium Ferricyanide, Red Prussiate of Potash.

Red transparent prismatic crystals, soluble in four times their weight of water and having a saline, slightly astringent taste.

Used as a reagent. See the Pharmacopœia, page 391. Also used in the arts for dyeing, photography, etc.

Potassii Ferrocyanidum; U. S.

FERROCYANIDE OF POTASSIUM.

Potassicum Ferrocyanidum—Potassium Ferrocyanide, Yellow Prussiate of Potash.

Description and Tests.—See the Pharmacopœia, page 267. Clean crystals, free from powder and not discolored.

Not now used medicinally. Has been given in **doses** of 0.5 to 1 gram (8 to 15 grains) as an astringent and anodyne.

Potassii Hypophosphis; U. S.

HYPOPHOSPHITE OF POTASSIUM.

Potassicus Hypophosphis—Potassium Hypophosphite.

Description and Tests.—See the Pharmacopœia, page 267.

Very deliquescent, and must, therefore, be kept in tightly corked bottles, the corks to be dipped in paraffin.

Medicinal Uses.—Same as of other hypophosphites. Supposed to be beneficial in cases of *nervous debility* in which phosphorus might prove useful.

Dose.—0.5 to 2 grams (8 to 30 grains), two or three times a day, generally in the form of syrup or in combination with other hypophosphites.

Potassii Iodidum; U. S.

IODIDE OF POTASSIUM.

Potassicum Iodidum—Potassium Iodide; Kalium Jodatum, Jodkalium, G. and Sw.; *Iodure de potassium*, F.; *Ioduro potasico*, Sp.; *Iodide of Potash.*

Description and Tests.—See the Pharmacopœia, page 268.

Must be neutral; an alkaline reaction denotes the presence of potassium carbonate, which is frequently added to make the product white. Free iodine makes the crystals yellowish.

Medicinal Uses.—Those of Iodine, which see. Iodine is generally administered in the form of this salt. Iodide of potassium is useful in *secondary* and *tertiary stages of syphilis;* in *glandular enlargements* and *tumors;* and in *lead-* and *mercury-poisoning* to promote the elimination of the poison.

If given for a long time, its use may give rise to a condition called *iodism*, characterized by general debility and fever, pain over the brows, coryza, and an eruption of the skin, which occasionally becomes very severe, resembling, and sometimes mistaken for, syphilitic eruption.

Also used externally in the form of ointment in *glandular swellings*, syphilitic and non-syphilitic.

Dose.—0.1 to 1 gram (2 to 15 grains), two or three times a day; fifteen grams (½ ounce), or more, may be given daily to syphilitic patients.

Solution for Dispensing Purposes.—Dissolve two hundred grams (7 ounces 24 grains avoirdupois) iodide of potassium in enough distilled water to make the finished solution measure two hundred cubic centimeters (6¾ U. S. fluidounces). Filter.

Each cubic centimeter of the solution contains one gram of the salt; one hundred and five minims contains one hundred grains.

POTASSII IODIDI UNGUENTUM; U. S.

OINTMENT OF IODIDE OF POTASSIUM.

Dissolve twelve grams (185 grains) iodide of potassium and one gram (15 grains) hyposulphite of sodium in six cubic centimeters (1½ fluidrachm) boiling water, in a warm mortar; then add gradually, during constant trituration, eighty-one grams (2 ounces 375 grains) benzoinated lard.

The addition of hyposulphite of sodium is intended to prevent the

preparation from turning brown from liberated iodine. Petrolatum ought to have been substituted for the benzoinated lard in this preparation.

Potassii Nitras; U. S.

NITRATE OF POTASSIUM.

Potassicus Nitras—Potassium Nitrate; Kali Nitricum, Nitras Kalicus, Nitrum—Salpeter, Kalisalpeter, Salpetersaures Kali, G.; *Azotate de potasse, Nitrate de potasse, Salpétre*, F.; *Nitrato potasico, Nitro puro*, Sp.; *Salpeter, Salpetersyradt Kali*, Sw.; *Saltpetre, Nitre, Nitrate of Potash.*

Description and Tests.—See the Pharmacopœia, page 268.

The granulated purified potassium nitrate ("crystalline powder") is the best.

Commercial saltpetre is frequently contaminated and even adulterated with sodium chloride; but a pure salt may be readily obtained.

Medicinal Uses.—Refrigerant, diaphoretic, and diuretic. Sometimes employed at the outset of *fevers*, etc. In very large doses it may prove poisonous, and if too long continued in smaller doses it deranges the digestion and impoverishes the blood.

The inhalation of the vapor of burning paper, which has been saturated with nitre, is beneficial in *asthma.*

Dose of Nitre.—Fifteen to thirty grams ($\frac{1}{2}$ to 1 ounce) daily, in divided doses, largely diluted.

POTASSII NITRATIS CHARTA; U. S.

PAPER OF NITRATE OF POTASSIUM.

Nitre Paper.

Soak pieces of white filter-paper, about twenty centimeters (8 inches) square, in a solution of thirty grams (1 ounce) nitrate of potassium in one hundred and twenty cubic centimeters (4 fluidounces) of water. Suspend the saturated paper on twine, or in any other convenient way, until dry.

Should be preserved in a well-closed vessel.

This preparation is new to the United States Pharmacopœia.

Used for inhalation, one piece being burnt and the vapor from it inhaled. This vapor contains nitrous oxide. Especially useful in some cases of *asthma.*

Potassii Permanganas; U. S.

PERMANGANATE OF POTASSIUM.

Potassicus Permanganas—Potassium Permanganate; Kali Hypermanganicum—Uebermangansaures Kali, G.; *Permanganate de potasse*, F.; *Öfvermangansyradt Kali*, SW.

Description and Tests.—See the Pharmacopœia, page 269.

Large fine crystals should be preferred.

Permanganate of potassium must not be triturated or even mixed with glycerin, or other readily oxidizable substances, as explosion may result.

Medicinal Uses.—It is a powerful disinfectant, and is much used in solutions containining from five to twenty per cent. of the salt as a wash for *gangrenous, phagædenic, cancerous*, or other *foul ulcers*, or discharges. It is also used as a gargle in *diphtheria, scarlatina*, etc. It has also been given internally, but with doubtful results.

Dose.—0.1 to 0.3 gram (2 to 5 grains), largely diluted with water.

Potassii Phosphas.

PHOSPHATE OF POTASSIUM.

Potassicus Phosphas—Potassium Phosphate.

A white, deliquescent, amorphous salt, freely soluble in water. It has a saline taste.

Medicinal Uses.—Supposed to exert an alterative effect in *phthisis*, etc.

Dose.—One to two grams (15 to 30 grains).

Potassii Sulphas; U. S.

SULPHATE OF POTASSIUM.

Potassicus Sulphas—Potassium Sulphate; Kali Sulphuricum, Sulfas Kalicus.

Description and Tests.—See the Pharmacopœia, page 269.

Medicinal Uses.—Laxative in small doses; irritant cathartic in large doses.

Dose.—Two to fifteen grams (30 grains to ½ ounce), largely diluted with water.

Potassii Sulphis; U. S.

SULPHITE OF POTASSIUM.

Potassicus Sulphis—Potassium Sulphite.

Description and Tests.—See the Pharmacopœia, page 270.

Medicinal Uses.—Sometimes, though rarely, employed as an antiseptic for the same purposes as the hyposulphite of sodium.

Dose.—One to two grams (15 to 30 grains), every two or three hours.

Potassii Tartras; U. S.

TARTRATE OF POTASSIUM.

Potassicus Tartras—Potassium Tartrate; Kali Tartaricum, Tartarus solubilis.

Description and Tests.—See the Pharmacopœia, page 270.

Medicinal Uses.—Diuretic in small, laxative in large doses. Occasionally combined with senna.

Dose.—Ten to thirty grams (150 grains to 1 ounce).

Potiones.

POTIONS.

Potions or draughts are aqueous solutions of salts, flavored or sweetened, or not. Sometimes infusions and mixtures are called potions. They are draughts taken in doses exceeding a tablespoonful.

Prinos; U. S.

PRINOS.

Prinos Cortex—Black Alder.

Origin.—*Prinos verticillatus*, Linné (*Aquifoliaceæ*).

Habitat.—The United States and Canada.

Part used.—The bark.

Description.—See the Pharmacopœia, page 271.

Constituents.—Resin, and some bitter principle not yet fully examined.

Medicinal Uses.—An astringent bitter tonic, of occasional use in *fevers*, especially if accompanied by a relaxed condition of the mucous membranes, as in *diarrhœa*, etc.

Dose.—Two to five grams (30 to 75 grains), best given in the form of a FLUID EXTRACT made with *diluted alcohol* as a menstruum.

Propylamina.

PROPYLAMINE.

A colorless inflammable liquid of high refractive power. It is not used in medicine. The "propylamine" met with in the trade is an aqueous solution of trimethylamine or hydrochlorate of trimethylamine (see Trimethylamina).

Prunum; U. S.

PRUNE.

Pruni Fructus.

Origin.—*Prunus domestica*, Linné (*Rosaceæ*).

Habitat.—Cultivated in all temperate climates.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 271.

French prunes are the best. Must be large, plump, sound, and not too dry.

Constituents.—Sugar, malic acid, etc.

Used as a laxative food.

Prunus Virginiana; U. S.

WILD CHERRY.

Pruni Virginianæ Cortex — Wild Cherry Bark.

Origin.—*Prunus serotina*, Ehrhart (*Rosaceæ*).

Habitat.—The United States.

Part used.—The inner bark collected in the autumn from the branches of young, sound trees.

Description.—See the Pharmacopœia, page 271.

Must be collected from medium large branches. The bark from the small branches, as well as cork-covered old bark, must be rejected as inferior. Should be at least two millimeters ($\frac{1}{12}$ inch) thick, and at the same time free from any corky outer bark.

Constituents.—Tannin, amygdalin, emulsin, some resin, and a bitter principle. When macerated with water it yields hydrocyanic acid, generated by the reaction of the amygdalin and emulsin in the presence of water, oil of bitter almonds being simultaneously formed.

Medicinal Uses.—Bitter tonic and stomachic, with slight sedative effect. Used in *dyspepsia, painful gastric derangements, coughs*, etc.

Dose.—Two to four grams (30 to 60 grains) in powder.

PRUNI VIRGINIANÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Wild Cherry.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), mix eighty-five grams (3 avoirdupois ounces) of glycerin with one hundred and seventy grams (6 ounces) of water. Moisten five hundred grams (17⅔ avoirdupois ounces) of wild cherry bark, in No. 20 powder, with the whole of the mixture. Pack it loosely in a cylindrical percolator, cover it well, and set it aside for twenty-four hours. Then take it out and re-pack it tightly in the percolator. Now percolate with diluted alcohol. Reserve four hundred cubic centimeters (13½ fluidounces) of *first percolate.* Then continue the percolation and collect six hundred cubic centimeters (20 fluidounces) of *second percolate.* Evaporate the second percolate to a thin syrup. Meanwhile continue the percolation to exhaustion, distil off the alcohol in the usual way from the *third percolate*, and evaporate the remainder of it on a water-bath to a thin syrup. Mix the syrupy liquids obtained from the second and third percolates and evaporate the mixture to a thin extract. Dissolve this extract in the *first percolate*, and finally add enough diluted alcohol to make the total product measure five hundred cubic centimeters (17 fluidounces).

The object of the maceration with water and glycerin is the formation of hydrocyanic acid by the reaction of the amygdalin and emulsin in the bark upon each other, which takes place only in the presence of water. Glycerin aids in keeping the dissolved matters in permanent solution in the finished extract, and also to retain better the hydrocyanic acid and volatile oil formed. The percolate is collected in three portions, in order to avoid as far as possible the exposure of the extract to heat, which would expel the volatile constituents, and thus render the preparation less rich in its most important constituents, if not wholly worthless.

A fluid extract of wild cherry made with water alone, or with water and glycerin (without the use of any alcohol), will also contain the hydrocyanic acid and the volatile oil, if the drug can be exhausted and the percolate reduced to its proper bulk without a damaging exposure to heat, which is impossible except by using a very tall and narrow percolator, so as to insure that the menstruum is made to pass through as many new portions of the drug as possible. But such a preparation would not represent fully and properly the medicinal properties of wild cherry bark, because the astringent constituent (tannin) would remain to a great extent in the marc. The addition of alcohol is necessary to completely exhaust the drug.

Fluid extract of wild cherry is a dark reddish-brown preparation, having a strong bitter-almond odor, and a pleasant, somewhat astringent taste. It is the best preparation of wild cherry which has been made.

Dose.—Two to four cubic centimeters (30 to 60 minims).

PRUNI VIRGINIANÆ INFUSUM; U. S.

Infusion of Wild Cherry.

Moisten thirty grams (1 avoidupois ounce) of wild cherry, in No. 40 powder, with forty-five cubic centimeters (1½ fluidounce) of water, and macerate one hour; then pack it tightly in a conical glass percolator and percolate with water until the percolate weighs seven hundred and fifty grams (or measures 25 fluidounces).

This preparation contains hydrocyanic acid and a volatile oil similar to that of bitter almonds, and is used as a mild tonic and cardiac sedative, either alone or as a menstruum for other more active remedies, in the *irritative cough* of consumptives, *hectic fever*, etc.

Dose.—Fifty to one hundred cubic centimeters (1½ to 3 fluidounces), three or four times a day.

PRUNI VIRGINIANÆ SYRUPUS; U. S.

Syrup of Wild Cherry.

Moisten one hundred and twenty grams (4 ounces 100 grains) wild cherry bark, in No. 20 powder, with water, and macerate it in a covered vessel for twenty-four hours. Then pack it firmly in a cylindrical percolator and percolate with water until three hundred and fifty grams (12 ounces 150 grains, or about 12 fluidounces) percolate has been received. In this dissolve six hundred grams (21 ounces) sugar by agitation, using no heat. Then add fifty grams (1 ounce 330 grains) glycerin. Strain.

This formula affords, with good bark and proper care, a very fine product.

Used mainly as an excipient in cough mixtures.

Dose.—About fifteen cubic centimeters (½ fluidounce).

PRUNI VIRGINIANÆ VINUM.

Wine of Wild Cherry.

Mix sixty cubic centimeters (2 fluidounces) fluid extract of wild cherry with two hundred and forty cubic centimeters (8 fluidounces) sherry wine. Each five cubic centimeters (teaspoonful) represents one gram (15 grains) of wild cherry.

Dose.—Ten to thirty cubic centimeters (3 to 8 fluidrachms).

PRUNI VIRGINIANÆ VINUM FERRATUM.

FERRATED WINE OF WILD CHERRY.

Dissolve forty grams (1 ounce 180 grains) soluble phosphate of iron in one hundred cubic centimeters (3⅓ fluidounces) water; add phosphoric acid to this solution until the precipitate which at first forms has all been redissolved, taking care to stir well, and to add no more phosphoric acid than is absolutely necessary to obtain a clear, light-brownish solution. Then add one hundred and twenty cubic centimeters (4 fluidounces) elixir of orange and five hundred cubic centimeters (17 fluidounces sherry wine. Next add one hundred cubic centimeters (3⅓ fluidounces) fluid extract of wild cherry (made with equal parts glycerin and water, without alcohol), and finally sufficient sherry wine to make the whole measure one thousand cubic centimeters (34 fluidounces).

A bitter chalybeate tonic, given in **doses** of one or two teaspoonfuls, three times a day.

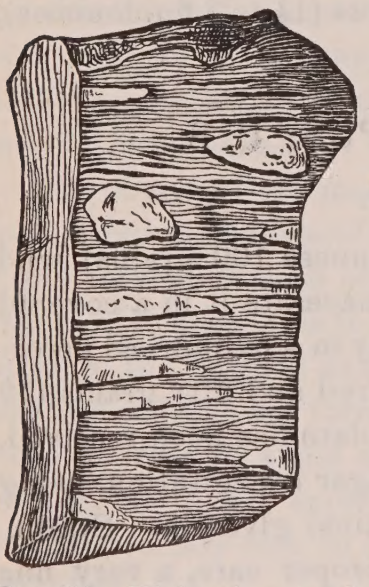


FIG. 431.—Waferash, natural size.

Ptelea.

PTELEA.

Ptelea Cortex—Waferash Bark, Shrubby Trefoil Bark, Hoptree Bark.

Origin.—*Ptelea trifoliata*, Linné (*Rutaceæ*).

Habitat.—North America.

Part used.—The bark of the root.

Description.—Irregular fragments of a light-brown color.

Medicinal Uses.—An appetizing tonic, occasionally useful during *convalescence*, in *dyspepsia*, etc.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims), best given in the form of fluid extract.

PTELEÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PTELEA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Pulsatilla; U. S.

PULSATILLA.

Pulsatillæ Herba.

Origin.—*Anemone pulsatilla*, and *Anemone pratensis*, Linné; and *Anemone patens*, var. *Nuttalliana*, Gray (*Ranunculaceæ*).

Habitat.—The two first-named plants in Europe; the third in the United States.

Part used.—The whole plant, collected soon after flowering.

Description.—See the Pharmacopœia, page 271.

Constituents.—Contains an acrid volatile principle, which breaks up into anemonin and anemonic acid.

Medicinal Uses.—Formerly employed in Germany as an alterative and emmenagogue, but discarded on account of its worthlessness. We do not know why it was introduced into the present Pharmacopœia, unless on account of a supposed beneficial effect in *amaurosis*.

In large doses it may produce nausea and vomiting.

Dose.—Usually stated to be about 0.3 gram (5 grains), in powder, although the extract has been given in much larger doses.

PULSATILLÆ EXTRACTUM.

EXTRACT OF PULSATILLA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.03 to 0.1 gram ($\frac{1}{2}$ to 2 grains), two or three times daily; may be cautiously increased to 0.33 gram (5 grains).

PULSATILLÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF PULSATILLA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Dose.—0.1 to 0.3 cubic centimeter (1 to 5 minims), several times a day.

Pulveres.

POWDERS.

Simple powders, or powdered drugs and chemicals, are frequently of a most inferior quality, and are sometimes actually offered for sale at lower prices than the whole drugs of barely fair quality. Sometimes the poorest grades of drugs are used for making powders, because it is almost impossible to determine the quality of the drugs after powdering except by color, odor, and taste, which are good guides only with those who are unusually familiar with the subject. In other cases actual adulteration is resorted to, which it is frequently impossible to detect by ordinary means. Such adulterations may consist of foreign materials, the presence of which may be detected by the microscope. We know, however, of cases in which the marc left in the percolator after the drug was exhausted was dried and sold to spice mills, to be mixed with a small proportion of fresh drug and then powdered and sold as a cheaper grade of powdered spice. Such adulteration is difficult to detect with the microscope, as the adulterant shows the histological elements of the true drug. The microscope reveals adulterations in powdered drugs to those only who are familiar with its use, and who therefore will not be deceived by appearances. Hence the pharmacist should always suspect a powdered drug offered at a price which apparently proves that a good grade of the drug could not have been used in preparing the powder. It is exceedingly unfortunate that retail pharmacists cannot prepare their own powdered drugs; but such is the fact, for the machinery, fixtures, and apparatus necessary for their preparation are out of the question in connection with a dispensing pharmacist's store and necessarily limited laboratory.

When a drug is to be powdered it is generally necessary to first dry it by a carefully regulated heat, not exceeding 65° C. (149° F.) as a rule. The whole of the quantity operated upon must be reduced to powder, nothing remaining except inert woody fibre, or other inert portions; for the powder first obtained is in many cases a very different one from that obtained at the end of the process. Thus if the drug is ground or contused until a portion is reduced to fine powder, and this powder then separated by sifting, the powder then obtained may be very far from being like the powder made afterward from the remainder of the drug. In some cases the powder first obtained is from the best and most active portions of the drug; in other cases the exact reverse. Hence the whole must be reduced to powder, and uniformly mixed after the powdering is finished.

Compound powders are made by the dispensing pharmacist. In

preparing them trituration in a mortar is the best method, and should be always employed except in cases where the substances to be mixed are such as cannot be triturated together without danger (as chlorate of potassium with oxidizable substances). To mix powders on a slab with the spatula is a very crude and unsafe method. The ingredients of the powder are, as a rule, put in the mortar in the order of the respective quantities used of each, commencing with those of which the smallest quantities are employed, carefully mixing before adding each subsequent ingredient.

As a diluent in powders, milk sugar is to be preferred to any other substance, because of its hardness, its comparative insolubility, and its density. Ordinary white sugar (cane sugar) is too readily soluble, and hence may be frequently dissolved out of a powder, leaving the medicament in the spoon, if insoluble, heavy, and of very small bulk, as calomel.

Physicians who frequently prescribe compound powders would do well to use some bright-colored vehicle, as, for instance, powdered milk sugar colored with a minute quantity of carmine. The pharmacist would then plainly see when the mixture of the several ingredients is completed, which is impossible when all the ingredients are of the same color, as frequently happens. Mixtures of morphine and sugar, calomel and bicarbonate of sodium, etc., may frequently be imperfectly finished, because the eye cannot determine when the ingredients are really intimately blended.

Powders containing volatile oils, extracts, camphor, soluble chemical salts, or any other volatile or hygroscopic substances, should be dispensed in waxed paper, instead of in ordinary white powder paper.

Pulvis Effervescens Compositus; U. S.

Compound Effervescing Powder.

Seidlitz Powder.

Mix 2.60 grams (40 grains) bicarbonate of sodium and 7.75 grams (120 grains) Rochelle salt, and fold the mixture in a blue paper.

Put 2.25 grams (35 grains) powdered tartaric acid in a white paper.

The above quantities are for one seidlitz powder. The proportions differ somewhat from those of the old Pharmacopœia (1870), and are the proper proportions to be used.

Medicinal Uses.—Each of the two powders is separately dissolved in a quarter of a tumbler of plain or sweetened water, and then the contents of one glass is poured into the other. The solution is to be taken during effervescence.

Useful as a laxative, especially in cases of *gastric* or *intestinal derangement* accompanied by *nausea*, as after a *debauch*, etc.

Pyrethrum ; U. S.

PYRETHRUM.

Pyrethri Radix—Römische Bertramwurzel, G.; *Pyréthre, Salivaire*, F.; *Pelitre*, Sp.; *Bertramsrot*, Sw.; *Pellitory.*

Origin.—*Anacyclus Pyrethrum*, De Candolle (*Compositæ*).

Habitat.—Northern Africa.

Part used.—The root.

Description.—See the Pharmacopœia, page 274. The wild pellitory from Africa has a thin bark firmly adhering to the wood. The resin-ducts are numerously scattered through both bark and wood. The odor is aromatic, and the taste pungent, causing a copious flow of saliva.

The German pellitory from *Anacyclus officinarum*, Hayne, cultivated near Magdeburg and in Saxony, is longer, and has a thicker bark. Pellitory is liable to be damaged by insects.

PYRETHRUM ROSEUM.—The ground flower-heads of this plant furnishes the so-called Persian insect powder.

Constituents.—Volatile oil and acrid resin.

Medicinal Uses.—Stimulant sialagogue, useful in *toothache, neuralgia, paralysis* of the tongue or constrictors of the œsophagus.

Dose.—One to four grams (15 to 60 grains), to be chewed.

PYRETHRI TINCTURA ; U. S.

TINCTURE OF PYRETHRUM.

Moisten sixty grams (2 ounces 50 grains) pyrethrum, in No. 40 powder, with fifty-five cubic centimeters ($1\frac{4}{5}$ fluidounce) alcohol ; macerate twenty-four hours ; then pack it firmly into a cylindrical percolator and percolate with alcohol until three hundred grams (10 ounces 255 grains, measuring about $12\frac{1}{2}$ fluidounces) of tincture has been obtained.

Used in dilution as a gargle.

Pyroxylinum ; U. S.

PYROXYLIN.

Pyroxylon, Colloxylon—Soluble Gun-Cotton.

Preparation.—See the Pharmacopœia, page 275. It is improbable that any considerable number of pharmacists will attempt to prepare gun-cotton, as it is a most troublesome preparation to make.

Gun-cotton must be white, light, dry, and entirely soluble in a mixture of one-fourth alcohol and three-fourths ether, by measure.

It must be kept loosely placed in wide-mouthed bottles, to be well closed and put away in a cool dry place, away from any flame, as it is violently explosive. Only about thirty grams (1 ounce) should be put in each bottle.

Used for preparing collodion.

Quassia; U. S.

QUASSIA.

Quassiæ Lignum—Jamaica Quassia.

Origin.—*Picræna excelsa*, Lindley (*Simarubaceæ*).

Habitat.—West Indies.

Part used.—The wood.

Description.—See the Pharmacopœia, page 275. It occurs either rasped or in shavings.

The quassia used in Europe is the wood of *Quassia amara*, Linné, of

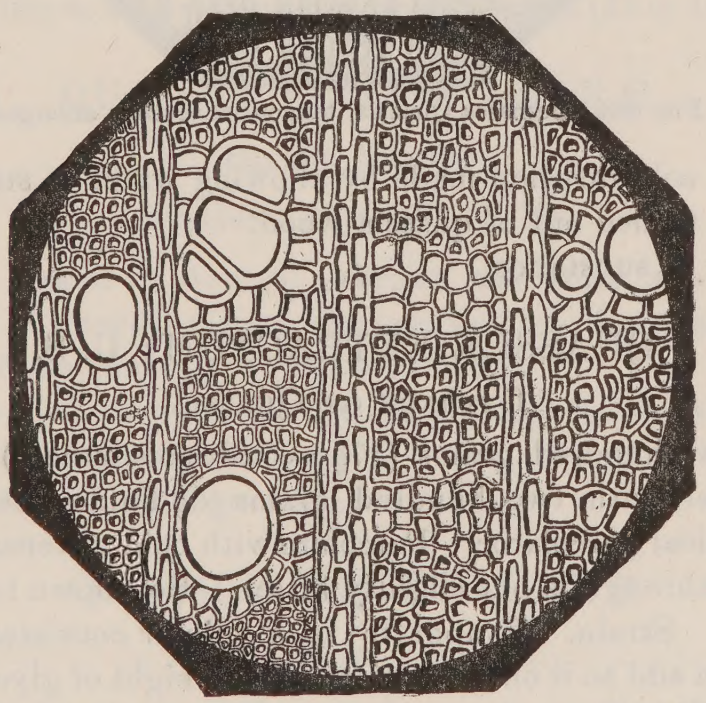


FIG. 432.—Jamaica Quassia, transverse section, magnified.

the same natural order as the plant which yields the drug used in this country. The wood of Quassia amara is called "Surinam Quassia," the shrub from which it is obtained being indigenous to Surinam. It resembles the "Jamaica Quassia," which is the kind official in our Pharmacopœia. The two kinds are quite alike medicinally.

Constituents.—A bitter principle called *quassiin*, which crystal-

lizes in white prisms or needles, and is readily soluble in alcohol and in hot water. Also a minute quantity volatile oil. It contains no tannin.

Medicinal Uses.—A pure bitter tonic appetizer and stomachic, useful in some forms of *dyspepsia* and *apepsia*. Sometimes used in the

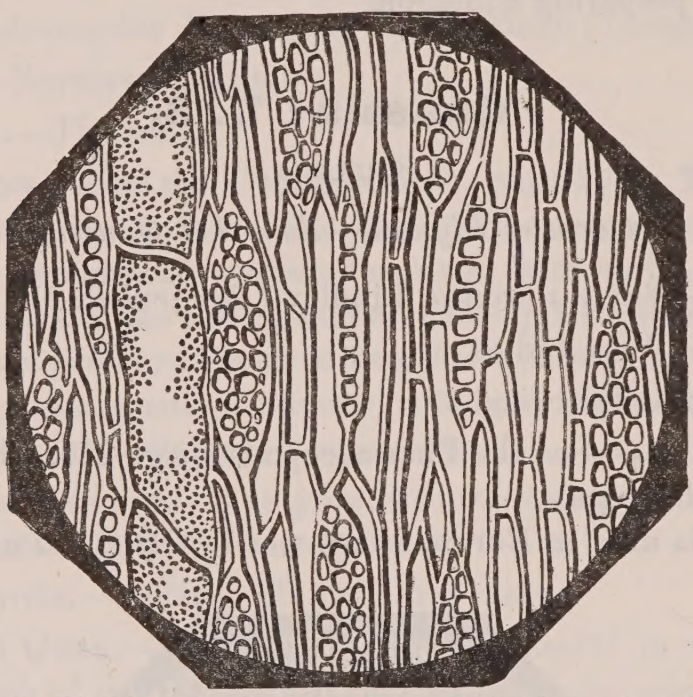


FIG. 433.—Jamaica Quassia, tangential section, enlarged.

form of weak cold infusion made by allowing water to stand for a little while in cups turned out of quassia wood.

Not given in substance.

QUASSIÆ EXTRACTUM; U. S.

EXTRACT OF QUASSIA.

Moisten five hundred grams (17⅔ avoirdupois ounces) of quassia, in No. 20 powder, with two hundred grams (6⅔ fluidounces) cold water. Pack in a conical percolator. Percolate with cold water until the liquid which passes through is but slightly bitter. Boil down to three-fourths of its weight. Strain. Evaporate to a pilular consistence, and while it is still warm add to it one-twentieth of its weight of glycerin.

Brown. Yield about four or five per cent.

Dose.—0.05 to 0.15 gram (1 to 2 grains).

QUASSIÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF QUASSIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

QUASSIÆ INFUSUM.

Infusion of Quassia.

From ten grams (about ⅓ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

QUASSIÆ SPECIES AMARÆ.

Bitter Species.

Boecker's Bitter Tonic Tea.

Mix sixty grams (2 ounces) crushed star anise, one hundred and twenty grams (4 ounces) rasped quassia, and one hundred and twenty grams cut carduus benedictus (blessed thistle).

Used to prepare a "bitters" by macerating for some days in about a liter (34 fluidounces) of whiskey.

Dose.—About a tablespoonful.

QUASSIÆ TINCTURA; U. S.

Tincture of Quassia.

Moisten thirty grams (463 grains) quassia, in No. 40 powder, with thirty cubic centimeters (1 fluidounce) diluted alcohol; macerate twenty-four hours; pack it firmly in a cylindrical percolator and percolate with diluted alcohol until three hundred cubic centimeters (10½ fluidounces) tincture has been obtained.

This preparation is over fifty per cent. stronger than that of the former Pharmacopœia.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Quercus Alba; U. S.

White Oak.

Quercus Albœ Cortex— White Oak Bark; Eichenrinde, G.; *Écorce de chêne*, F.; *Encina*, Sp.; *Ekbark*, Sw.

Origin.— *Quercus alba*, Linné (*Cupuliferæ*).

Habitat.—The United States.

Part used.—The inner bark from the trunk of the tree.

Description.—See the Pharmacopœia, page 276. Usually occurs coarsely ground. "Black oak bark" (from *quercus tinctoria*) colors the saliva yellow, which the official oak bark does not.

Constituents.—A peculiar variety of tannin, called *quercitannic acid.* Younger bark contains more tannin than the old. The quantity found is from six to fifteen per cent.

Medicinal Uses.—Astringent; the infusion is mainly employed externally as an injection or wash in *leucorrhœa*, *prolapse* of the *uterus* or *rectum*, etc.; or as a gargle and mouth-wash in *relaxed uvula*, *follicular pharyngitis*, and *spongy* or *bleeding* gums.

QUERCUS DECOCTUM.

Decoction of Oak Bark.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms), but it is seldom given internally. It is a most useful and popular injection in *leucorrhœa*, etc.

QUERCUS EXTRACTUM FLUIDUM.

Fluid Extract of Oak Bark.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims), or in dilution for external use.

Quillaia; U. S.

QUILLAIA.

Soap Tree Bark.

Origin.—*Quillaya Saponaria*, Molina (*Rosaceæ*).

Habitat.—Chili and Peru.

Part used.—The bark deprived of the epidermis.

Description.—See the Pharmacopœia, page 276. Inodorous, but very irritating to the mucous surfaces, producing violent sneezing; taste quite acrid.

Constituents.—The principal constituent is *saponin.*

Medicinal Uses.—Stimulant, diuretic, alterative, irritant, detergent; also as a sternutatory in *coryza.*

Dose.—One to two grams (15 to 60 grains). Best given in fluid extract.

QUILLAIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF QUILLAIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

QUILLAIÆ TINCTURA.

TINCTURE OF QUILLAIA.

Tincture of Soap Bark.

Make three hundred cubic centimeters (10 fluidounces) tincture from sixty grams (2 ounces) ground soap bark, using diluted alcohol as a menstruum.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Quinamina.

QUINAMINE.

Quinamia.

An alkaloid found in red cinchona bark.

White anhydrous crystals, soluble in thirty-two parts ether and in one hundred parts alcohol. Very soluble in boiling ether. Its salts in

aqueous solution, acidulated, do not show any fluorescence. With chlorine-water and ammonia they give no green color nor precipitate.

Medicinal Uses resemble those of quinine, but the effects are uncertain.

Dose.—0.05 to 1.5 gram (1 to 20 grains).

Quinetum.

QUINETUM.

This is a mixture of the total alkaloids of cinchona, obtained by exhausting red cinchona with acidulated water, and precipitating with soda. It was originally proposed by Dr. DeVrij, and is in India known under the name of "Febrifuge."

Quinicina.

QUINICINE.

Quinicia.

When quinine or quinidine is fused in the presence of an acid it is converted into an amorphous alkaloid called *quinicine*, which has the same composition apparently as the alkaloid from which it was derived.

Medicinal Uses.—Similar to those of quinine, but weaker and uncertain.

Dose.—0.05 to 1.5 gram (1 to 20 grains).

Quinidinæ Sulphas; U. S.

SULPHATE OF QUINIDINE.

Sulphate of Quinidia.

Origin, Description, and Tests.—See the Pharmacopœia, page 276. Quinidine sulphate is probably fully equal to quinine sulphate as an antiperiodic.

Dose.—The same as of quinine.

Quinina; U. S.

QUININE.

Quinia.

The most important alkaloid contained in cinchona. The alkaloid contained in the sulphate of quinine. It is usually obtained by precipitating a solution of sulphate of quinine with water of ammonia.

Description and Tests.—See the Pharmacopœia, page 277.

Medicinal Uses.—Same as of cinchona. The alkaloid is used mainly for making other preparations. It is seldom given internally except in the form of one of its salts.

When given for any length of time, or in full doses, the salts of quinine are apt to produce a condition of "cinchonism," characterized by symptoms of congestion of the brain, fulness about the head, ringing in the ears, and occasionally slight deafness, and after excessive doses, staggering, blindness, nausea, etc. These effects are usually only temporary, but are said to have resulted in permanent injury after long-continued abuse of quinine.

Dose.—0.05 to 0.5 gram (1 to 8 grains) or more.

QUININÆ OLEATUM.

OLEATE OF QUININE.

A solution of one part alkaloidal quinine in three parts oleic acid, effected by simply triturating them together.

Uses.—It has been recommended for hypodermic injection, and for external application; but has not met with the approval of physicians.

QUININÆ SOLUTIO SPIRITUOSA.

ALCOHOLIC SOLUTION OF QUININE.

Dissolve one hundred grams (3 ounces 230 grains) quinine (the pure alkaloid) in nine hundred cubic centimeters (30½ fluidounces) alcohol. Then add sufficient alcohol to make the whole measure one liter (34 fluidounces).

Used in making elixirs.

Quininæ Arsenias.

ARSENIATE OF QUININE.

An insoluble white powder. It contains about twelve and a half per cent. arsenious acid, and about seventy-five per cent. quinine.

Medicinal Uses.—Antiperiodic in chronic malarial affections. The effect is mainly due to the arsenic.

Dose.—0.008 to 0.03 gram (⅛ to ½ grain).

Quininæ Bisulphas; U. S.

BISULPHATE OF QUININE.

Description and Tests.—See the Pharmacopœia, pages 277 and 278.

Medicinal Uses and Dose.—Same as of sulphate of quinine.

Quininæ Carbolas.

QUININE CARBOLATE.

Dissolve six grams (92 grains) carbolic acid in thirty-seven cubic centimeters (1¼ fluidounce) alcohol; then add ten grams (154 grains) quinine (alkaloid) and dissolve all by the aid of gentle heat. Filter. Evaporate the filtrate on a water-bath to dryness.

The product thus obtained is a white powder, soluble in four hundred parts of water and in eighty parts of alcohol.

Dose.—Five centigrams (about 1 grain).

Quininæ Hydrobromas; U. S.

HYDROBROMATE OF QUININE.

Description and Tests.—See the Pharmacopœia, page 278.

Medicinal Uses and Dose.—Same as of the other salts of quinine. On account of its solubility it is a good form for administering quinine hypodermically.

Quininæ Hydrochloras; U. S.

QUININE HYDROCHLORATE.

Muriate of Quinine.

Description and Tests.—See the Pharmacopœia, pages 278, 279. Being very readily soluble in alcohol (three times its own weight) and also much more readily soluble in water than quinine sulphate, the hydrochlorate of quinine ought to be used in preference to sulphate of quinine in all cases.

Medicinal Uses and Dose.—Same as of other salts of quinine. Has been used hypodermically.

QUININÆ HYDROCHLORATIS PILULÆ.

PILLS OF HYDROCHLORATE OF QUININE.

Pills of hydrochlorate of quinine may be made with glycerin as the only excipient. They are beautifully white (provided, of course, the hands and tools of the operator are perfectly clean), permanently soft and readily soluble.

Quininæ Hydrochloras Carbamidata.

QUININE CARBAMIDE HYDROCHLORATE.

In white powder or in crystals, soluble in twice its weight of water. It is said to be a compound of hydrochlorate of quinine and urea, and contains sixty-nine per cent. quinine.

Medicinal Uses.—Perhaps the most soluble and least irritating of all quinine salts for subcutaneous injection.

Dose for subcutaneous injection, 0.3 to 0.5 gram (5 to 8 grains).

Quininæ Hypophosphis.

HYPOPHOSPHITE OF QUININE.

Prepared by double decomposition between calcium hypophosphite and quinine sulphate. It is in white, needle-shaped crystals, adhering in groups, inodorous, bitter, soluble in twenty-five parts cold and in 1.2 part boiling water, and in nine parts alcohol.

Dose.—Ten centigrams (1½ grain).

Quininæ Phosphas.

PHOSPHATE OF QUININE.

Obtained in silky white crystals by dissolving the alkaloid quinine in phosphoric acid and evaporating to crystallization. This is neutral phosphate. Soluble in water.

A basic phosphate of quinine may be obtained by precipitating a solution of sulphate of quinine with a solution of phosphate of sodium. Very sparingly soluble in water.

Medicinal Uses and Dose.—Same as of sulphate of quinine.

Quininæ Salicylas.

SALICYLATE OF QUININE.

Prepared by mixing solutions of quinine and salicylic acid in ether, and collecting and drying the precipitate formed. It is a white amorphous powder, insoluble in water, alcohol, and ether.

Dose.—Ten to one hundred centigrams (2 to 16 grains).

Quininæ Sulphas; U. S.

SULPHATE OF QUININE.

Chininum Sulfuricum, Quinicus Sulphas—Schwefelsaures Chinin, G.; *Sulfate de quinine*, F.; *Sulfato Quinico, Sulfato de quinina*, Sp.; *Svafvelsyrad Kinin, Kinasalt*, Sw.; *Sulphate of Quinia, Disulphate of Quinia.*

Description and Tests.—See the Pharmacopœia, pages 279, 280.

To completely mask the taste of quinine sulphate give the medicine in fresh sweet milk. One gram (15 grains) sulphate of quinine can be taken in a cupful of rich milk without tasting its bitterness, especially if the quinine be stirred in quickly and the dose taken before much of the salt dissolves in the milk. One pint of milk will conceal the bitter taste of fifteen grains quinine sulphate even if dissolved. Fluid extract of liquorice root is also very effective in masking the taste of quinine. It should be remembered, however, that when fluid extract of liquorice root is used for this purpose no acid must be added, as that not only brings out the bitterness of the quinine more strongly, but, at the same time, precipitates the glycyrrhizin from the fluid extract, thus destroying its power to conceal the bitterness of the medicine. The sulphate of quinine must be simply suspended undissolved in the mixture, which requires to be shaken before being taken.

One grain sulphate of quinine is generally considered equivalent in antiperiodic effects to forty grains good calisaya bark.

Medicinal Uses.—Quinine exerts the tonic and antiperiodic effects of cinchona. It is the most frequently employed salt of quinine and the most reliable antiperiodic remedy we possess. As a tonic it is inferior to cinchona itself, as it is apt to derange the digestive functions if administered for any length of time.

Quinine possesses strong antiseptic properties, and is therefore useful in many of the septic diseases, as *diphtheria, scarlatina, erysipelas*, etc. It is also much used as an antipyretic to reduce the temperature in febrile conditions, but it is always safe to combine its use with other antipyretic measures, as cold baths, etc.

It is not an oxytocic.

Dose.—0.06 to 2 grams (1 to 30 grains) or more, in single or divided doses, according to the requirements of the case.

Solution for Dispensing Purposes.—Dissolve thirty grams (1 ounce $25\frac{1}{2}$ grains avoirdupois) of quinine sulphate, with the aid of twenty-five grams ($\frac{5}{6}$ fluidounce) diluted sulphuric acid, in enough distilled water to

make the finished solution measure one hundred and twenty cubic centimeters (4 fluidounces). Filter.

The diluted sulphuric acid should be added last. Each cubic centimeter of the solution contains one-fourth gram (25 centigrams) of the quinine sulphate; one hundred and five minims contain twenty-five grains.

QUININÆ SULPHATIS PILULÆ.

SULPHATE OF QUININE PILLS.

Glycerin is the only excipient required to make handsome, white, and permanently soft pills of sulphate of quinine. When, however, the addition of sulphuric acid (either in the form of diluted or aromatic sulphuric acid) is preferred or ordered, it will be found necessary to add also other excipients to prevent the pills from becoming too hard and from crumbling. About twelve drops aromatic sulphuric acid is sufficient for twenty grains quinine sulphate. The addition of minute quantities of powdered tragacanth and glycerin will make the mass plastic.

Quininæ Tannas.

TANNATE OF QUININE.

A yellowish amorphous powder. It is bitter, somewhat astringent, nearly insoluble in cold water or alcohol, and melts at the boiling-point of water.

Medicinal Uses and Dose.—Same as of sulphate of quinine, but on account of its comparative insolubility it is less reliable in its action.

QUININÆ TINCTURA COMPOSITA; WARBURG.

WARBURG'S TINCTURE.

Mix one hundred grams (3 ounces 230 grains) angelica root, eighty grams (2 ounces 360 grains) gentian, eighty grams cubeb, eighty grams rhubarb, eighty grams fennel, eighty grams elecampane, forty grams (1 ounce 180 grains) Spanish saffron, thirty grams (1 ounce 25 grains) aromatic powder, twenty grams (308 grains) myrrh, and twenty grams white agaric, all in moderately fine powder. Moisten the mixed powders with five hundred cubic centimeters (17 fluidounces) diluted alcohol, and macerate twenty-four hours. Then pack it firmly in a cylindrical percolator and percolate with diluted alcohol until six thousand five hundred cubic centimeters (13¾ pints) of percolate has been obtained. In this dissolve two hundred grams (7 ounces 24 grains) sulphate of quinine

by gently warming the mixture. Then add one thousand cubic centimeters (34 fluidounces) spirit of camphor and two thousand five hundred cubic centimeters (5½ pints) tincture of aloes (U. S. P., 1880).

Warburg's tincture is a celebrated and much-used antiperiodic, which is stated to be decidedly more effective in the cure of severe types of intermittent and remittent fevers than any other quinine mixture or quinine itself in proportionately equal doses.

The original formula for the preparation is, however, so absurd as to throw ridicule upon the remedy, notwithstanding its well-established efficacy. It is never made by the original formula. The Warburg's tincture now used is prepared by simplified formulæ which differ more or less from each other, but certainly do not include the "bellies of scinks" and four or five dozen other curious things prescribed in the original, but which apparently in most cases furnish preparations as effective as Warburg's tincture is reported to have been.

The formula given above is a fair and rational simplification of the original, and yields a product as satisfactory in all respects as any.

Dose.—This tincture enjoys great reputation as an antiperiodic remedy. Its use is preceded by a brisk purgative, and then fifteen cubic centimeters (½ fluidounce) is given undiluted, and this dose is repeated in three or four hours. It is said that this treatment usually suffices to arrest even very severe attacks of malarial fevers.

Quininæ Valerianas; U. S.

VALERIANATE OF QUININE.

Description and Tests.—See the Pharmacopœia, page 280.

Medicinal Uses.—This salt combines the nervine properties of valerian with the antiperiodic and tonic effects of quinine.

Dose.—0.05 to 0.2 gram (1 to 3 grains).

Resina; U. S.

RESIN.

Pini Resina, Colophonium—*Geigenharz*, G.; *Colophane*, F.; *Colofonia, Brea seca, Pez Griega*, Sp.; *Hartz, Kolophonium*, Sw.; *Rosin, Colophony.*

Description.—See the Pharmacopœia, page 280. Should be quite light colored, clear, and transparent, and free from bark, sand, dirt, and other admixtures.

"Resin," or colophony, is the residue left after distilling the volatile oil (oil of turpentine) from the turpentine (the oleo-resin exuding from

pine trees), when no water is added before the distillation. If water is added the residue will not be the official clear resin, but "white rosin," which is pale yellowish and opaque from retained water.

Composition.—Consists of anhydrid of abietic acid.

Used as an ingredient of plasters and ointments.

RESINÆ CERATUM; U. S.

RESIN CERATE.

Basilicon Ointment.

Melt together, at a moderate heat, one hundred grams (3½ ounces) resin, forty-five grams (1½ ounce) yellow wax, and one hundred and forty grams (5 ounces) lard; strain through muslin, and let cool *without stirring.*

To obtain a uniform cerate it should *not* be stirred while cooling.

The new preparation contains less lard than that of the Pharmacopœia of 1870, and is an improvement upon the old.

Basilicon ointment is one of the most popular ointments for stimulating indolent ulcerating surfaces, promoting suppuration, granulation, and cicatrization.

RESINÆ CERATUM COMPOSITUM; PHAR., 1870.

Compound Resin Cerate, Deshler's Salve.

Melt together three hundred and forty grams (12 ounces) resin, three hundred and forty grams suet, three hundred and forty grams yellow wax, one hundred and seventy grams (6 ounces) crude American turpentine (thick), and two hundred grams (7 ounces) linseed oil; strain through muslin, and stir until cool.

Not in the new Pharmacopœia.

Somewhat more stimulating than basilicon ointment.

RESINÆ EMPLASTRUM; U. S.

RESIN PLASTER.

Adhesive Plaster.

Melt together forty-five grams (1½ ounce) yellow wax, six hundred grams (20 ounces) lead plaster, and one hundred and five grams (3½ ounces) resin, and mix them thoroughly.

Should be spread before being allowed to cool.

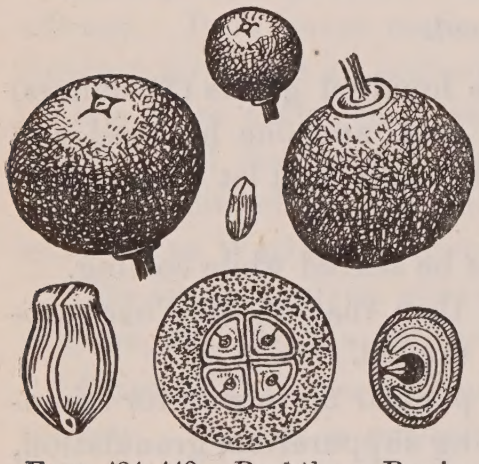
This is a marked improvement upon the preparation of 1870 as to consistence and adhesiveness. The old preparation consisted of one

ounce resin to six ounces lead plaster. The new plaster is better for spreading. It is difficult, however, to put it up in rolls, because in cooling the wax is very liable to separate in little lumps. If re-melted for the purpose of spreading it, it must be well stirred.

Rhamni Cathartici Fructus.

BUCKTHORN BERRIES.

Origin.—*Rhamnus catharticus*, Linné (*Rhamnaceæ*).



FIGS. 434–440.—Buckthorn Berries, whole, natural size, enlarged, and transverse section; seeds, natural size, enlarged, and transverse section.

Habitat.—Europe and America.

Description.—Purplish-black, wrinkled, globular, about the size of small peas, and containing four dark-brown seeds. Odor faint; taste bitter, acrid.

Constituents.—The active principle is amorphous *rhamnocathartin*, which has been obtained as a brittle yellowish mass.

Medicinal Uses.—Brisk hydragogue purgative, mainly employed in combination with other cathartics.

Dose.—Two to five grams (30 to 75 grains), best given in the form of fluid extract.

RHAMNI CATHARTICI FRUCTUS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF BUCKTHORN BERRIES.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 20 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

RHAMNI CATHARTICI SUCCUS.

BUCKTHORN JUICE.

The expressed juice from fresh buckthorn berries.

It is greenish when fresh, but changes to purplish-black on keeping.

This juice is a very acrid cathartic, and is not much used.

Dose.—One to four cubic centimeters (15 to 60 minims).

RHAMNI CATHARTICI SYRUPUS.

SYRUP OF BUCKTHORN BERRIES.

Evaporate one thousand cubic centimeters (34 fluidounces) buckthorn juice to six hundred and twenty-five cubic centimeters (21 fluidounces). Add ten grams (154 grains) bruised ginger and ten grams bruised allspice; macerate in a warm place for four hours; strain. Let cool. Then add seventy-five cubic centimeters (2½ fluidounces) alcohol. Shake well. Let the mixture stand two days. Decant the clear liquid, filter the remainder, and in the mixed clear liquids dissolve one thousand grams (35 ounces 120 grains) sugar.

Dose.—About five cubic centimeters (a teaspoonful).

FIG. 441.—Cascara Sagrada, young bark, natural size.

Rhamnus Purshiana.

CASCARA SAGRADA.

Chittem Bark.

Origin.—*Rhamnus Purshiana*, De Candolle.

Habitat.—Rocky Mountains and the Pacific slope.

FIG. 442.—Root-bark of Cascara Sagrada, natural size.

Part used.—The bark.

Description.—Thin brittle troughs or quills, several inches to a foot or more in length; the bark from young branches mottled or figured as in the illustration, the dark parts being nearly black, the light parts whitish or ash-colored, with intermediate shades of brown. In older barks the contrast is not so marked, all parts appearing brownish-gray on the outside, though the figures may be traced, and on the inner side yellowish-brown or orange-yellow. The root bark is thicker, darker, irregularly twisted, and with a rough external bark. Odorless. Taste bitter.

Constituents.—Contains three different resinous substances, and some tannin.

Medicinal Uses.—This remedy is a valuable tonic laxative in *chronic constipation*, the effect resembling that of aloes com-

bined with nux vomica and belladonna. It produces a semi-solid feculent discharge, and its use is not followed by subsequent constipation, as is the case with most cathartics.

Dose.—One to four grams (15 to 60 grains), best given as fluid extract.

RHAMNI PURSHIANÆ EXTRACTUM.

EXTRACT OF RHAMNUS PURSHIANA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Yellowish-brown.

Dose.—0.25 to 1 gram (4 to 15 grains).

RHAMNI PURSHIANÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CASCARA SAGRADA.

To make five hundred cubic centimeters (or its equivalent—17 fluidounces), use five hundred grams (or 17⅔ avoirdupois ounces) of the drug, in No. 40 powder.

As a *menstruum* use a mixture of alcohol and water in the proportion of two hundred cubic centimeters (6¾ fluidounces) alcohol and five hundred cubic centimeters (17 fluidounces) water.

Dose.—One to four cubic centimeters (15 to 60 minims).

Rheum; U. S.

RHUBARB.

Rhei Radix—Rhabarber, G. and Sw.; *Rhubarbe*, F.; *Ruibarbo*, Sp.; *Rhubarb Root*, "*Turkey Rhubarb.*"

Origin.—*Rheum officinale*, Baillon, and other species of *Rheum* (*Polygonaceæ*).

Habitat.—China.

Part used.—The peeled and dried root.

Description.—See the Pharmacopœia, page 282.

Chinese or so-called East India rhubarb is now the only rhubarb of commerce, and is the article described in the Pharmacopœia. Shensi rhubarb is very fine, and probably the best.

The irregularly marbled internal appearance of rhubarb is an important diagnostic sign by which the official rhubarb is distinguished

rom European rhubarb, obtained from *Rheum rhaponticum*, which is ot one-half as active.

Rhubarb must be perfectly sound, and of an orange-yellowish color. t must not be dark or discolored. A grayish- or greenish-brown or ark-colored drug is at least partially decayed, and while it may undoubtedly be true rhubarb in a commercial sense, it is a very bad rhubarb commercially, and is not rhubarb at all medicinally.

Sound, fine rhubarb of a good light color, and good odor, can be eadily recognized, and may be easily found in the market. It is usually described as "*fancy*" rhubarb by the jobbers, although the only ifference between it and any less "fancy" grades lies in the fact that he fancy or select pieces of rhubarb are sound and good, while all other rades are more or less decayed, damaged, or otherwise inferior, and hould not be used.

Good rhubarb costs at this time (March, 1883) from one to two dollars per pound, while a decayed drug may be had at from twenty cents pward. Powdered rhubarb is sometimes sold at a much lower price han the whole, and is mostly of a very inferior grade. European rhubarb, if sound, is better than half-decayed Chinese rhubarb.

Constituents.—Chrysophan (several per cent.), chrysophanic acid, hæorhetin, rheo-tannic acid, emodin, erythrorhetin, aporhetin, etc. he grittiness of rhubarb between the teeth is due to crystals of calium oxalate. Rhubarb also contains a considerable quantity of starch.

Medicinal Uses.—Rhubarb is a valuable stomachic and tonic in *owel complaints.* It is laxative or cathartic, and then astringent, so hat its use is especially indicated in cases of *diarrhœa* caused by the resence of indigestible or irritating substances in the alimentary canal. t is a valuable remedy in *chronic constipation* and *dyspepsia*, in which ilments a small piece may be eaten every morning until relief is obained.

Dose.—0.5 to 2 grams (10 to 30 grains).

RHEI ET POTASSÆ SYRUPUS.

Syrup of Rhubarb and Potassa.

Percolate a mixture of thirty grams (1 ounce) coarsely powdered hubarb, fifteen grams ($\frac{1}{2}$ ounce) powdered hydrastis, and fifteen grams $\frac{1}{2}$ ounce) powdered cinnamon with a mixture of one liter (34 fluidounces) randy and five hundred cubic centimeters (17 fluidounces) glycerin. o the percolate add one cubic centimeter (16 minims) oil of peppermint, ifteen grams ($\frac{1}{2}$ ounce) carbonate of potassium, five hundred cubic centimeters (17 fluidounces) water, and one thousand grams (35 ounces)

sugar. Dissolve by the aid of gentle heat, and then filter. This is popularly called "neutralizing cordial," or "neutralizing mixture."

Dose.—A teaspoonful or more.

RHEI ET SENNÆ TINCTURA.

Tincture of Rhubarb and Senna.

Macerate for seven days thirty-two grams (1 ounce 56 grains) rhubarb, eight grams (123 grains) senna, four grams (61 grains) coriander, four grams fennel, and two grams (31 grains) liquorice—all in moderately fine powder—together with one hundred and ninety-two grams (6 ounces 338 grains) raisins previously deprived of their seeds and bruised, with one thousand four hundred and fifty cubic centimeters (49 fluidounces) diluted alcohol. Express, and filter through paper.

Dose.—Teaspoonful to dessertspoonful.

RHEI ET SODÆ MISTURA; U. S.

Mixture of Rhubarb and Soda.

Dissolve thirty grams (463 grains) bicarbonate of sodium in five hundred grams (17 fluidounces) distilled water. Then add thirty grams (about 1 fluidounce) fluid extract of rhubarb, thirty grams (about $1\frac{1}{4}$ fluidounce) spirit of peppermint, and sufficient distilled water to make the whole mixture weigh one thousand grams (or measure about 34 fluidounces).

This mixture is new to the Pharmacopœia; it is similar to the popular so-called "neutralizing cordial" or "neutralizing mixture," with the exception that the latter-named preparation contains potassium carbonate instead of sodium bicarbonate.

Useful in some forms of *dyspepsia* or *flatulence*, in which a combination of rhubarb with an antacid is indicated.

Dose.—Five to thirty cubic centimeters (1 to 8 fluidrachms).

RHEI EXTRACTUM; U. S.

Extract of Rhubarb.

Moisten five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of rhubarb, in No. 30 powder, with two hundred grams ($8\frac{1}{3}$ fluidounces) of alcohol. Pack moderately in a conical percolator. Pour upon it four hundred grams ($16\frac{2}{3}$ fluidounces) more of alcohol, and then follow with diluted alcohol, continuing the percolation until the percolate passes tasteless. Reserve five hundred grams (about 18 fluidounces) of *first percolate*, set-

ng it aside *in a warm place* where it may evaporate spontaneously ntil reduced to two hundred and fifty grams (about 9 ounces). Evap-rate the remainder of the percolate in a porcelain evaporating dish on water-bath at a heat not above 70° C. (158° F.) to the consistence of yrup. Mix this with the reserved and concentrated *first percolate*, and nen evaporate the mixture on water-bath at the same temperature as efore to a pilular consistence. While the extract is still warm incor-orate with it one-twentieth of its weight of glycerin. Yield about nirty per cent.

Reddish-brown.

Dose.—0.50 to 1.50 gram (8 to 20 grains).

RHEI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Rhubarb.

To make five hundred cubic centimeters (or its equivalent—17 U. S. uidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois unces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of nree hundred grams (about 12½ fluidounces) alcohol to every one hun-red grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 8 fluidounces) of ne menstruum. Pack it tightly in a cylindrical percolator. Saturate ith menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and seventy-five cubic centimeters (12⅕ fluid-unces) of the *first percolate*. Continue the percolation until the drug exhausted.

Evaporate the *second percolate* to the consistence of honey, and then issolve it in the *first percolate*. Add enough of the menstruum to make ne whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to eight cubic centimeters (½ to 2 fluidrachms).

RHEI INFUSUM.

Infusion of Rhubarb.

From twenty grams (308 grains) bruised rhubarb, free of dust, make ve hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

RHEI INFUSUM ALKALINUM.

Alkaline Infusion of Rhubarb.

Put thirty grams (1 ounce 25 grains) rhubarb in small fragments and free from powder into a suitable vessel with six grams (92 grains) sodium carbonate and three hundred cubic centimeters (10 fluidounces) cold water. Macerate twelve hours. Strain, adding enough cold water through the strainer to make the total colature three hundred cubic centimeters (10 fluidounces). Then add six hundred cubic centimeters (20 fluidounces) alcohol, and set aside for twenty-four hours. Then filter. Distil off the alcohol and expose the remainder to evaporation on a water-bath until all odor of alcohol has disappeared. Finally add enough water to make the whole measure three hundred cubic centimeters (10 fluidounces).

Keep it in a cool place.

RHEI MISTURA COMPOSITA.

Compound Rhubarb Mixture.

Dissolve forty grams (1 ounce 180 grains) bicarbonate of sodium in six hundred cubic centimeters (about 20 fluidounces) peppermint water; then add four cubic centimeters (1 fluidrachm) fluid extract of ipecac, twenty cubic centimeters (5 fluidrachms) fluid extract of rhubarb, three hundred and fifty-five cubic centimeters (12 fluidounces) glycerin, and enough peppermint water to make the whole measure one thousand cubic centimeters (34 fluidounces).

Dose.—Teaspoonful to tablespoonful.

RHEI PILULÆ; U. S.

Rhubarb Pills.

Mix 19.50 grams (300 grains) finely powdered rhubarb and 6.50 grams (100 grains) powdered soap, and make a pill mass with the aid of sufficient water. Divide it into one hundred pills.

Dose.—One to five pills.

RHEI PILULÆ COMPOSITÆ; U. S.

Compound Rhubarb Pills.

Mix thirteen grams (200 grains) rhubarb, 9.75 grams (150 grains) purified aloes, and 6.50 grams (100 grains) myrrh, all in fine powder, with 0.65 gram (10 grains) volatile oil of peppermint. Make a pill mass with the aid of enough water, and divide it into one hundred pills.

Dose.—One to three pills.

RHEI PULVIS COMPOSITUS; U. S.

COMPOUND RHUBARB POWDER.

Mix twenty-five grams (386 grains) powdered rhubarb, sixty-five grams (2 ounces 128 grains) magnesia, and ten grams (154 grains) powdered ginger.

Used as an antacid and carminative.

Dose.—One to five grams (15 to 75 grains).

RHEI PULVIS CUM MAGNESIA.

"RHUBARB AND MAGNESIA."

Mix one cubic centimeter (16 minims) oil of fennel with one hundred grams (3 ounces 230 grains) powdered sugar; then add one hundred grams powdered rhubarb and one hundred grams carbonate of magnesia, and mix all thoroughly.

Dose.—0.50 to 2 grams (8 to 30 grains).

RHEI SYRUPUS; U. S.

SYRUP OF RHUBARB.

Macerate ninety grams (3 ounces 76 grains) sliced rhubarb, eighteen grams (278 grains) bruised cinnamon, and six grams (92 grains) potassium carbonate with four hundred and twenty cubic centimeters (14¼ fluidounces) water in a covered porcelain jar for twelve hours. Strain, and filter, adding enough water through the dregs on the filter to make the total filtrate measure four hundred cubic centimeters (13½ fluidounces). Then add six hundred grams (21 ounces 72 grains) sugar, and dissolve it without using any heat.

This preparation is very different from the syrup of rhubarb of the Pharmacopœia of 1870. It is identical with that of the German Pharmacopœia.

Frequently employed as a laxative for children.

Dose for a child, about a teaspoonful.

RHEI SYRUPUS AROMATICUS; U. S.

AROMATIC SYRUP OF RHUBARB.

Spiced Syrup of Rhubarb.

Mix thirty cubic centimeters (1 fluidounce) aromatic tincture of rhubarb and two hundred and ten cubic centimeters (7 fluidounces) simple syrup.

Used mainly as a stomachic, in teaspoonful doses.

RHEI SYRUPUS SIMPLEX; Phar. 1870.

Simple Rhubarb Syrup.

Mix thirty cubic centimeters (1 fluidounce) fluid extract of rhubarb and two hundred and ninety cubic centimeters (9⅔ fluidounces) simple syrup.

The syrup of rhubarb of the new Pharmacopœia contains cinnamon and potassium carbonate.

Used like the above.

RHEI TINCTURA; U. S.

Tincture of Rhubarb.

Moisten thirty-six grams (1 ounce 118 grains) coarsely ground rhubarb and six grams (93 grains) coarsely powdered cardamom seeds with thirty cubic centimeters (1 fluidounce) diluted alcohol; macerate twenty-four hours; then pack it firmly in a cylindrical percolator, and percolate with diluted alcohol until three hundred grams (or 300 cubic centimeters, equal to 10 fluidounces) tincture has been obtained.

While all the other tinctures, except tincture of catechu, have been changed so as to correspond with decimal proportions, the tincture of rhubarb, which was formerly (U. S. P., 1870) of ten per cent. strength, has now been made of twelve per cent. strength, probably by oversight.

Dose.—Five to twenty-five cubic centimeters (1 to 6 fluidrachms).

RHEI TINCTURA AQUOSA.

Aqueous Tincture of Rhubarb.

Rhei Infusum Compositum.

Macerate one hundred grams (3 ounces 230 grains) cut rhubarb, ten grams (154 grains) powdered borax, and ten grams potassium carbonate with eight hundred and fifty cubic centimeters (29 fluidounces) boiling water for fifteen minutes; then add one hundred and twenty cubic centimeters (4 fluidounces) alcohol, and continue the maceration an hour and a quarter. Express and filter. Add through the filter one hundred and fifty cubic centimeters (5 fluidounces) cinnamon water.

Dose.—Five to twenty-five cubic centimeters (1 to 6 fluidrachms).

RHEI TINCTURA AROMATICA; U. S.

Aromatic Tincture of Rhubarb.

Frequently misnamed "Aromatic Fluid Extract of Rhubarb."

Mix sixty grams (2 ounces 50 grains) rhubarb, twelve grams (185 grains) cinnamon, twelve grams cloves, and six grams (92 grains) nut-

meg. Reduce the mixture to No. 40 powder. Moisten it with forty-five cubic centimeters (1½ fluidounce) diluted alcohol. Macerate twenty-four hours. Pack tightly in a cylindrical percolator, and percolate with diluted alcohol until three hundred cubic centimeters (10 fluidounces) tincture has been obtained.

This preparation has been sold for many years under the name of "Fluid Extract of Rhubarb, Aromatic," being on nearly all fluid-extract lists.

Dose.—Five to twenty-five cubic centimeters (1 to 6 fluidrachms).

RHEI TINCTURA DULCIS; U. S.

Sweet Tincture of Rhubarb.

Mix twenty-four grams (370 grains) rhubarb, twelve grams (185 grains) liquorice root, twelve grams anise, and three grams (46 grains) cardamom. Reduce the mixture to No. 40 powder. Moisten with forty-five cubic centimeters (1½ fluidounce) diluted alcohol. Macerate twenty-four hours. Then pack it firmly in a cylindrical percolator and percolate with diluted alcohol until three hundred cubic centimeters (10 fluidounces) tincture has been obtained.

Dose.—Five to twenty-five cubic centimeters (1 to 6 fluidrachms).

RHEI VINUM; U. S.

Rhubarb Wine.

Mix thirty grams (1 ounce 25 grains) rhubarb, and three grams (46 grains) calamus, both in No. 30 powder, with fifteen cubic centimeters (½ fluidounce) stronger white wine; pack it in a conical percolator, and percolate with stronger white wine until three hundred cubic centimeters (10 fluidounces) percolate has been obtained.

This preparation is about one-third weaker than that of the old Pharmacopœia (1870).

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

RHEI VINUM AMARUM.

Bitter Wine of Rhubarb.

Macerate for five days ten grams (154 grains) bruised canella alba, twenty grams (308 grains) bruised gentian, and one hundred grams (3 ounces 230 grains) sliced rhubarb, with one thousand cubic centimeters (34 fluidounces) sherry wine. Express and filter, adding enough sherry wine through the filter to make the whole product measure one thousand cubic centimeters (34 fluidounces).

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

RHEI VINUM AROMATICUM.

AROMATIC WINE OF RHUBARB.

Tinctura Rhei Vinosa—German Wine of Rhubarb.

Macerate eighty grams (2 ounces 360 grains) cut rhubarb, twenty grams (308 grains) bruised orange peel, ten grams (154 grains) coarsely powdered cardamom, and one hundred and twenty grams (4 ounces 101 grains) sugar, for five days in a warm place with enough sherry wine to make one thousand cubic centimeters (34 fluidounces) final product after expression and filtration.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Rhœas.

RED POPPY.

Rhœados Petala—Red Poppy Flowers.

Origin.—*Papaver Rhœas*, Linné (*Papaveraceæ*).

Habitat.—Cultivated everywhere.

Part used.—The petals.

Description.—Round, about fifty millimeters (2 inches) in diameter, purplish-red. Inodorous; taste mucilaginous, bitter.

Constituents.—Traces of *rhœadine* and coloring matter. Probably no morphine or narcotine.

Used as a coloring agent. Formerly also employed as an anodyne.

RHŒADOS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF RED POPPY FLOWERS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

RHŒADOS SYRUPUS.

SYRUP OF RED POPPY.

Infuse four hundred grams (14 ounces 48 grains) fresh red poppy petals in six hundred cubic centimeters (20 fluidounces) water for twelve hours on a water-bath. Express, filter, and dissolve six hundred grams (21 ounces 72 grains) sugar in the filtrate. Add seventy-five cubic centimeters (2½ fluidounces) alcohol, and enough water to make the final product measure one thousand cubic centimeters (34 fluidounces).

Seldom employed.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Rhus Aromatica.

RHUS AROMATICA.

Fragrant Sumach, Sweet Sumach.

Origin.—*Rhus aromatica*, Aiton (*Anacardiaceæ*).

Habitat.—The Eastern portions of the United States.

Part used.—The bark of the root.

Description.—In quills or troughs, from five to twenty-five millimeters ($\frac{1}{4}$ to 1 inch) in diameter, and of various lengths, frequently quite short though occasionally more than one-half meter (20 inches) long. The corky outer bark is rust-brown, but with the cork removed the drug is walnut brown, about three millimeters ($\frac{1}{8}$ inch) thick. It is full of resin-ducts, and a transparent oleo-resin may be seen collected in little cavities. The wood is yellowish-white. Odor fragrant; taste bitter, astringent, aromatic, pungent.

Constituents.—Tannin, volatile oil, and resin.

Medicinal Uses.—Astringent, stimulant, diuretic, tonic. Said to be useful in *diseases of the genito-urinary organs*, *atonic diarrhœa*, *dysentery*, and the *summer complaints* of children.

Dose.—One to five grams (15 to 75 minims), best given as fluid extract.

RHOIS AROMATICÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF RHUS AROMATICA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about $8\frac{1}{3}$ fluidounces) alcohol to every one hundred grams (about $3\frac{1}{3}$ fluidounces) of water.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Rhus Glabra; U. S.

RHUS GLABRA.

Rhois Glabræ Fructus—Sumach Berries.

Origin.—*Rhus glabra*, Linné (*Anacardiaceæ*).

Habitat.—North America.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 283.

Constituents.—Tannin.

Medicinal Uses.—Sumach berries are slightly acidulous and mildly astringent. The diluted fluid extract is sometimes employed in catarrhal or other forms of *pharyngitis, spongy gums*, etc. It has also been used in *strangury* and *bowel complaints*, and externally as a wash in *ulcers* and some forms of *skin disease.*

Dose.—Two to five grams (30 to 75 grains), best given as fluid extract.

RHOIS GLABRÆ [FRUCTUS] EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Rhus Glabra [Berries].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, two hundred and twenty-five grams (about 7½ fluidounces) water, and fifty grams (about 1⅔ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6⅓ fluidounces) of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Rhois Glabræ Cortex.

Sumach Bark.

Description.—Quills or troughs, generally much broken into irregular fragments ; thin, brownish-gray, externally marked by scattered warts ; inner surface smooth, brownish. Odor none ; taste bitter, astringent.

Constituents.—Tannin, etc.

Medicinal Uses.—Astringent tonic. Used in *diarrhœas, night-sweats*, and in relaxed conditions of the mucous membranes, as in *leucorrhœa, gleet, gonorrhœa*, etc. The diluted fluid extract or decoction is often used as an astringent gargle, wash, or injection.

Dose.—Two to five grams (30 to 75 grains), best given as fluid extract.

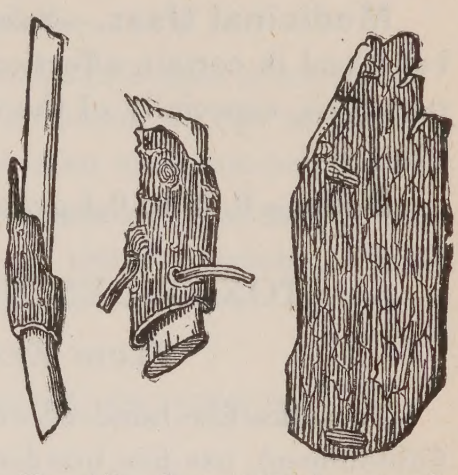


FIG. 443.—Sumach Bark, natural size.

RHOIS GLABRÆ DECOCTUM.

DECOCTION OF RHUS GLABRA.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms).

RHOIS GLABRÆ CORTICIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF SUMACH BARK.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

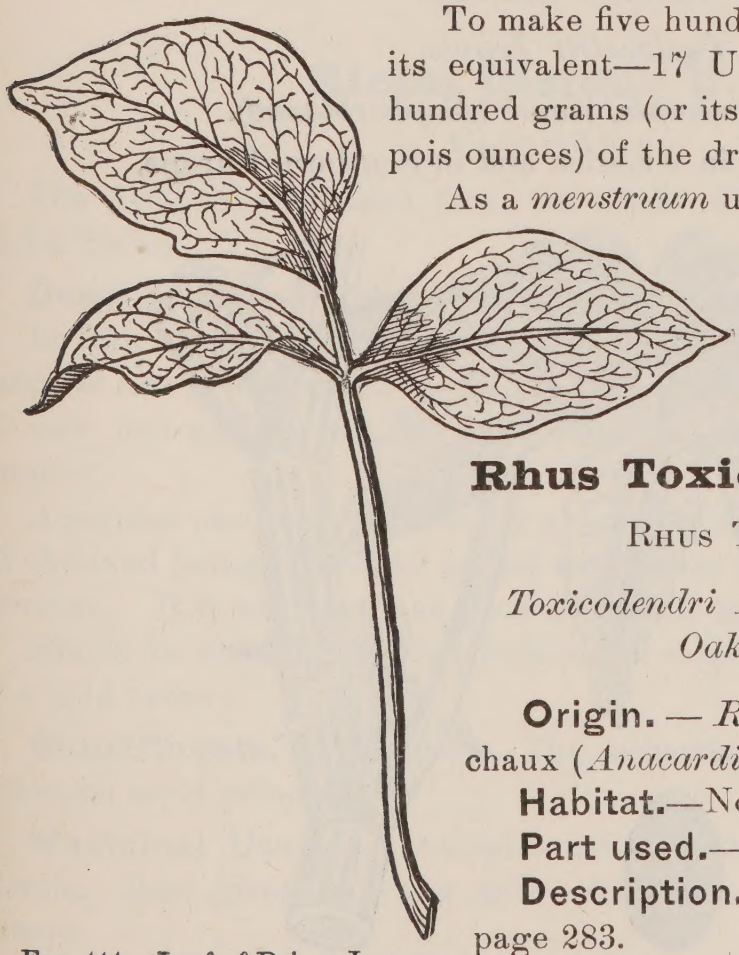


FIG. 444.—Leaf of Poison Ivy, reduced.

Rhus Toxicodendron; U. S.

RHUS TOXICODENDRON.

Toxicodendri Folia Recentes—Poison Oak, Poison Ivy.

Origin.—*Rhus Toxicodendron*, Michaux (*Anacardiaceæ*).

Habitat.—North America.

Part used.—The fresh leaves.

Description.—See the Pharmacopœia, page 283.

Dried leaves are worthless.

Constituents.—A volatile acid called *toxicodendric acid,* which is poisonous, causing severe vesicular eruptions and swelling.

Medicinal Uses.—Said to be an irritant narcotic, which has proved beneficial in certain affections of the nervous system, as in *paraplegia, paralysis,* especially of the rectum or bladder ; also in *chronic rheumatism,* etc.

Dose.—0.05 to 0.4 gram (1 to 6 grains).

TOXICODENDRI EXTRACTUM FLUIDUM.

Fluid Extract of Toxicodendron.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.4 cubic centimeter (1 to 6 minims).

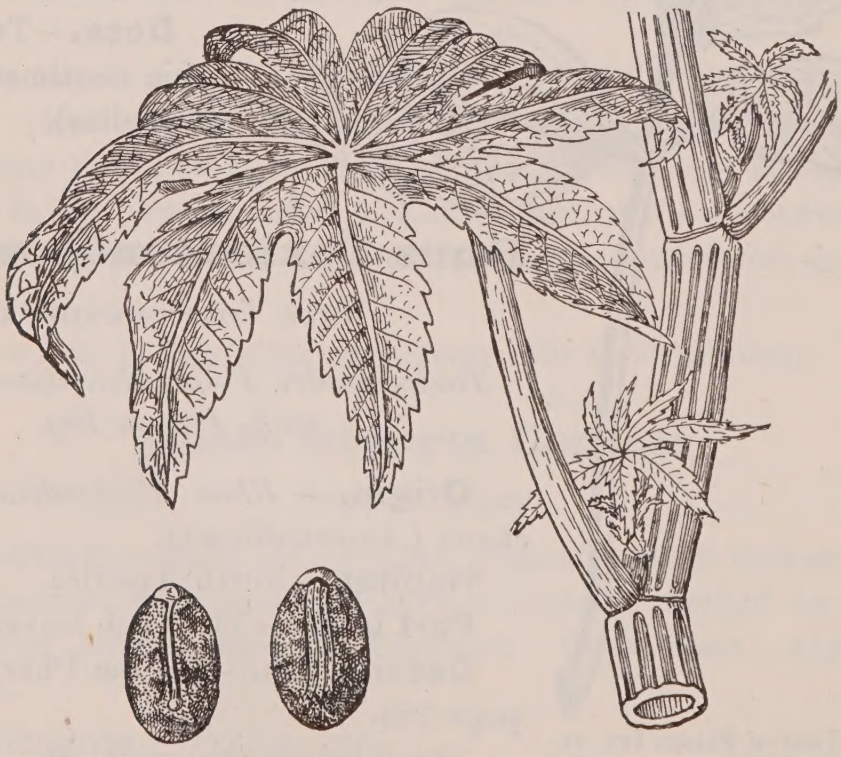
Ricini Folia.

Ricinus Leaves.

Castor-Oil Leaves.

Origin.—*Ricinus communis,* Linné (*Euphorbiaceæ*).

Habitat.—Cultivated in America and in Southern Europe.



Figs. 445, 446.—Leaf and Bean of Ricinus Communis. Bean natural size; leaf reduced.

Part used.—The leaves.

Description.—Large, handsome, bright green, formed as seen in the figure. Familiar as an ornamental yard plant.

Constituents.—An unknown acrid cathartic principle is contained in the leaves as well as in the fixed oil of the seeds of the castor-oil plant. The *ricinin* found by several chemists is an innocent substance.

Medicinal Uses.—It is said to increase the secretion of milk when taken internally by, or applied to the breasts of, nursing women. It is best used in the form of strong decoction.

RICINI FOLIORUM EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CASTOR-OIL LEAVES.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces, use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Ricini Oleum; U. S.

CASTOR-OIL.

The fixed oil expressed from the seeds of *Ricinus communis* (see Ricini Folia).

Description.—See the Pharmacopœia, page 241.

In Italy the oil is expressed by means of hydraulic presses at a temperature not exceeding 32° to 38° C. (90° to 100° F.). Italian castor-oil of very fine quality has been imported in small quantities into this country.

American castor-oil is made by expression from kiln-dried seeds, the oil obtained being afterward boiled with water to coagulate and remove albumen. It is not nearly as good as Italian castor-oil.

Should be almost entirely odorless and colorless, perfectly clear, and of a mild taste.

Constituents.—Ricinolein. The cathartic properties are due to an unknown acrid principle.

Medicinal Uses.—A valuable mild laxative for evacuating the bowels. Best given in warm milk which has been flavored with cinnamon.

Dose.—Five to thirty cubic centimeters (1 to 8 fluidrachms).

RICINI OLEI EMULSIO.

CASTOR-OIL EMULSION.

Triturate together thirty grams (1 ounce) castor-oil and fifteen grams ($\frac{1}{2}$ ounce) powdered acacia. Then add gradually, and during strong and uninterrupted trituration, thirty cubic centimeters (1 fluidounce) peppermint water, thirty cubic centimeters (1 fluidounce) simple syrup, and thirty cubic centimeters water. Finally add ten drops of chloroform and shake well.

The chloroform and peppermint water mask the taste. The addition of fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) brandy will still more effectually conceal the nauseous greasy taste of this much-detested oil.

Dose.—Tablespoonful or more.

Rosa Centifolia; U. S.

PALE ROSE.

Origin.—*Rosa centifolia*, Linné (*Rosaceæ*).

Habitat.—Cultivated; chiefly in France and in Asia Minor.

Part used.—The fresh petals.

Description.—See the Pharmacopœia, page 283.

Salted rose leaves are allowed to be used when fresh leaves cannot be obtained. The better plan would have been to dismiss pale rose from the Pharmacopœia. They are used only for preparing rose-water, for which purpose they are not required, the imported triple rose-water being much better as well as cheaper than any that can be made from either fresh or salted pale rose petals in this country; and for making compound syrup of sarsaparilla, in which preparation the pale rose is an entirely unnecessary ingredient.

Constituent.—A small quantity of volatile oil.

Used for flavoring.

ROSÆ AQUA; U. S.

ROSE-WATER.

Prepared by distillation, collecting ten pounds of distillate from every four pounds of recent pale rose.

Good recent pale rose is not easily obtainable. It is easy, however, to obtain excellent triple rose-water imported from France. If six pounds of "Triple Rose-Water" be mixed with four pounds distilled water the mixture will correspond in strength to the pharmacopœia rose-water, and makes a very fine product. Of the "Quadruple Rose-Water" four pounds will make ten pounds official rose-water.

Rose-water, when good, is delightfully fragrant.

ROSÆ AQUÆ UNGUENTUM; U. S.

OINTMENT OF ROSE-WATER.

Cold Cream.

Melt together at a gentle heat fifty grams (1 ounce 334 grains) expressed oil of almond, ten grams (154 grains) spermaceti, and ten grams (154 grains) white wax. Then add to the melted mixture gradually, and during brisk and uninterrupted stirring, thirty cubic centimeters (1 fluidounce) rose-water. Continue the stirring until the product is of a uniform soft and creamy consistence.

Used for chapped face or hands, or as a toilet article to soften and beautify the skin.

Rosa Gallica; U. S.

RED ROSE.

Origin.—*Rosa gallica*, Linné (*Rosaceæ*).

Habitat.—Cultivated.

Part used.—The dried petals.

Description.—See the Pharmacopœia, page 284. Should have a bright purplish-red color, and a good fragrant odor.

Constituents.—Small quantities of volatile oil and tannin.

Medicinal Uses.—Although slightly astringent, they are used chiefly to impart flavor to other remedies.

ROSÆ ACETUM.

VINEGAR OF ROSE.

Macerate for two hours one hundred grams (3 ounces 230 grains) red rose, with a mixture of ninety cubic centimeters (3 fluidounces) chemically pure acetic acid (thirty-six per cent. strength), seventy-five cubic centimeters (2½ fluidounces) alcohol, and nine hundred and forty cubic centimeters (32 fluidounces) water. Filter.

Used for toilet purposes.

ROSÆ CONFECTIO; U. S.

CONFECTION OF ROSE.

Warm thirty-two grams (9 fluidrachms) rose-water to 65° C. (150° F.), and then triturate sixteen grams (247 grains) powdered red rose with it. Then add gradually one hundred and twenty-eight grams (4 ounces 224

grains) finely powdered sugar and twenty-four grams (370 grains) honey, and beat the whole together until thoroughly mixed.

Same as in the Pharmacopœia of 1870.

It is only used as an excipient in making pill-masses.

ROSÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of [Red] Rose.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, two hundred and twenty-five grams (about 7½ fluidounces) water, and fifty grams (about 1⅘ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and seventy-five cubic centimeters (12⅕ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

ROSÆ INFUSUM ACIDULUM.

Infusion of Rose.

Infuse for half an hour ten grams (154 grains) red rose in three hundred cubic centimeters (10 fluidounces) boiling water, to which has been added five grams (77 grains) diluted nitric acid and thirty grams (1 ounce) sugar. Filter.

A popular vehicle for the administration of sulphate of quinine, of which ten grams (154 grains) may be dissolved in five hundred and fifty cubic centimeters (18½ fluidounces) of infusion, making a mixture of which each dessertspoonful contains two grains.

The infusion of rose is usually made with sulphuric acid, and was so

made in the Pharmacopœia of 1870; but when thus prepared it does not make a clear solution but a turbid mixture when quinine sulphate is added. With nitric acid, however, it makes a handsome solution of the quinine salt.

ROSÆ MEL; U. S.

HONEY OF ROSE.

Percolate forty grams (1 ounce 180 grains) red rose, in No. 40 powder, with diluted alcohol until one hundred and sixty-five grams (5 ounces 360 grains, or about 6½ fluidounces) percolate has been received. Of this set aside the first fifteen grams (½ fluidounce); evaporate the remainder of the percolate (the "second percolate") to twenty-five grams (386 grains, or about ⅞ fluidounce), and mix that with the first percolate, and finally add four hundred and sixty grams (16 ounces 100 grains) clarified honey and shake it all together.

A popular mouth-wash in *aphthæ*. It is liable to give rise to fermentation in the mouth and increase the trouble to remove which it is used. Glycerin with borax will prove more beneficial.

ROSÆ SYRUPUS; U. S.

SYRUP OF ROSE.

Mix thirty cubic centimeters (1 fluidounce) fluid extract of red rose and two hundred and ten cubic centimeters (7 fluidounces, or 270 grams) simple syrup.

Rosæ Oleum; U. S.

OIL OF ROSE.

Rosæ Ætheroleum — Volatile Oil of Rose, Otto of Rose.

Origin.—*Rosa damascena*, Miller (*Rosaceæ*).

Habitat.—Southern Europe and Asia Minor.

Description.—See the Pharmacopœia, pages 241, 242.

Used to impart a pleasant odor to other preparations.

ROSÆ SPIRITUS.

SPIRIT OF ROSE.

Mix two grams (30 grains) volatile oil of rose and one hundred cubic centimeters (3⅓ fluidounces) deodorized alcohol.

Used for the same purposes as the oil.

ROSATUM CERATUM; F.

Rose Cerate.

Melt together one ounce white wax and two ounces oil of sweet almond. Stir until cool. Then incorporate one grain of finely powdered carmine, and perfume with one drop oil of rose.

Used as a lip salve.

Rosmarinus; U. S.

Rosemary.

Rosmarini Folia—Rosmarinblätter, G.; *Feuilles de romarin*, F.; *Rosmarin*, Sw.

Origin.—*Rosmarinus officinalis*, Linné (*Labiatæ*).

Habitat.—Cultivated.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 284.

Constituents.—About one per cent. volatile oil, some resin, tannin, and bitter substance.

Properties.—Stimulant, diuretic, diaphoretic, carminative, emmenagogue. Also used externally in fomentation to relieve pain.

Dose.—One gram (15 grains) or more in infusion.

Rosmarini Oleum; U. S.

Oil of Rosemary.

Rosmarini Ætheroleum — Volatile Oil of Rosemary.

Description.—See the Pharmacopœia, page 242.

The best kind is known as "Huile de Romarin eperlé."

Dose.—Two to five drops.

ROSMARINI SPIRITUS.

Spirit of Rosemary.

Mix two grams (30 grains) oil of rosemary and one hundred and twenty cubic centimeters (4 fluidounces) alcohol.

Used as a perfume.

[ROSMARINI] SPIRITUS ODORATUS [COMPOSITUS]; U. S.

PERFUMED SPIRIT.

Cologne Water.

Mix sixteen grams (247 grains) oil of bergamot, eight grams (124 grains) oil of lemon, eight grams oil of rosemary, four grams (62 grains) oil of lavender flowers, four grams oil of orange flowers (oil of neroli), and two grams (31 grains) acetic ether with eight hundred grams (980 cubic centimeters, or 33 fluidounces) alcohol. Then add one hundred and fifty-eight grams (5⅓ fluidounces) water. Set the mixture aside for eight days. Filter.

Used as a perfume.

Rubi Fructus.

BLACKBERRY.

The well-known fruit of *Rubus villosus*, Aiton.

RUBI FRUCTUS SYRUPUS.

SYRUP OF BLACKBERRIES.

Beat any desired quantity of fresh ripe blackberries into a pulp. Let it stand at rest for three days in a place where the temperature is about 20° to 25° C. (68° to 77° F.). Then express the juice and set it aside until the vinous fermentation has ceased and the liquid becomes clear. Then filter. To every two kilograms (70½ ounces) of the filtered liquid add three kilograms (106 ounces) sugar, and heat to boiling in a porcelain or earthenware capsule, or in a bright (not tinned) copper kettle, and then strain while hot. Keep the syrup in well-filled and tightly corked bottles in a cool and dark place.

RUBI ELIXIR.

BLACKBERRY CORDIAL.

Mix fifteen cubic centimeters (½ fluidounce) aromatic fluid extract, one hundred and fifty cubic centimeters (5 fluidounces) fluid extract of blackberry root bark, four hundred cubic centimeters (13½ fluidounces) brandy, five hundred cubic centimeters (17 fluidounces) syrup of blackberries, and five hundred cubic centimeters elixir of orange.

Rubus; U. S.

RUBUS.

Rubi Radicis Cortex—Blackberry Root Bark.

Origin.—*Rubus villosus*, Aiton; *Rubus canadensis*, Linné; and *Rubus trivialis*, Michaux (*Rosaceæ*).

Habitat.—The United States.

Part used.—The bark of the root.

Description.—See the Pharmacopœia, page 284.

All wood must be rejected.

Constituents.—Tannin.

Medicinal Uses.—Similar to those of other vegetable astringents, and useful in *diarrhœas*, etc.

Used only in the form of fluid extract.

NOTE.—Blackberry jelly and blackberry jam, made from blackberry fruit, are often given to children to check summer-complaints and diarrhœas. Neither of these preparations is astringent, and both, especially the jam, on account of the hard seeds, generally increase the irritation of the bowels and intensify the symptoms of the disease.

RUBI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF RUBUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, one hundred and seventy-five grams (about 5⅚ fluidounces) water, and one hundred grams (about 3½ avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of ninety grams (about 3¾ fluidounces) alcohol to every seventy grams (about 2⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6⅓ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

RUBI SYRUPUS; U. S.

SYRUP OF RUBUS.

Syrup of Blackberry Root Bark.

Mix sixty cubic centimeters (2 fluidounces) fluid extract of blackberry root bark and one hundred and eighty cubic centimeters (6 fluidounces) simple syrup.

Used as an ingredient in astringent mixtures.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Rubus Idæus; U. S.

RASPBERRY.

Rubi Idæi Fructus.

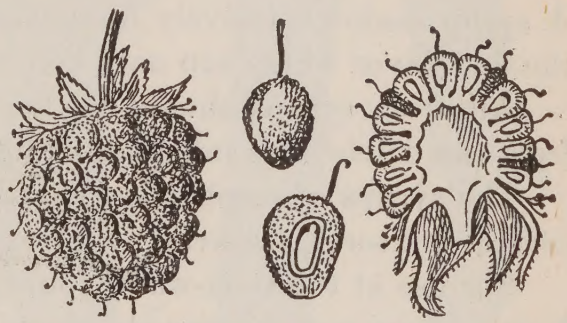
Origin.—*Rubus idæus*, Linné (*Rosaceæ*).

Habitat.—Europe and America.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 284.

The light red fruit of *Rubus strigosus*, Michaux, and the purplish black fruit of *Rubus occidentalis*, Linné, are also officially recognized as "raspberry."



FIGS. 447-450.—Raspberry, whole and longitudinal section, natural size; and drupes, whole and in longitudinal section, enlarged.

Constituents.—Citric and malic acids, pectin, fruit sugar, coloring matter, and a trace of volatile oil.

Used for flavoring.

RUBI IDÆI ACETUM.

RASPBERRY VINEGAR.

Crush twelve pounds good ripe red raspberries. Let stand in a crock for a week at about 40° C. (104° F.); press out the juice; bring it to the boiling point; add eight fluidounces chemically pure acetic acid (U. S. P. 1880) and four pints water. Filter. Add ten pounds sugar. Must be kept in well-filled and tightly corked bottles in a cool and dark place. Mixed with water and sugar to suit, this makes a delightful cooling drink.

Tartaric or citric acid may be used in place of acetic acid, employing six ounces of one or the other for the quantity of berries specified above.

RUBI IDÆI SYRUPUS; U. S.

SYRUP OF RASPBERRY.

Beat any desired quantity of fresh ripe raspberries into a pulp. Let it stand at rest for three days in a place where the temperature is about 20° to 25° C. (68° to 77° F.). Then express the juice and set it aside until the vinous fermentation has ceased and the liquid becomes clear. Then filter. To every two kilograms (70½ ounces) of the filtered liquid add three kilograms (106 ounces) sugar and heat to boiling in a porcelain or earthenware capsule or in a bright (not tinned) copper kettle, and then strain while hot. Keep the syrup in well-filled and tightly corked bottles in a cool and dark place.

During the fermentation much of the pectin is gotten rid of, which makes the syrup keep a great deal better.

The product will have a fine color if ten per cent. of the raspberries used be the so-called "black cap" raspberries (from *Rubus occidentalis*). A syrup made exclusively from black raspberries will, however, not have the fine flavor which can only be obtained from red raspberries.

All fruit syrups should be kept in amber bottles to preserve them from the deleterious influence of light.

The syrups of raspberries, cherries, etc., are very useful additions to certain mixtures, imparting a pleasant flavor.

For use at the soda-water fountain the fruit syrups made from fresh fruit or from well-preserved natural fruit juices are the only ones fit for use. Artificial fruit flavors, which are so commonly used, are very interesting chemically and technologically, but they are simply abominable in soda-water syrups.

The syrups of cherries; red, white, or black currants; mulberries; blackberries; strawberries; sweet orange juice; lemon juice; quince; pineapple, etc., all may be prepared in the same manner as syrup of raspberry.

Rumex; U. S.

RUMEX.

Rumicis Radix — Yellow Dock.

Origin.—*Rumex crispus*, Linné, and other species of *Rumex* (*Polygonaceæ*).

Habitat.—Europe and America.

Part used.—The root.

Description.—See the Pharmacopœia, page 285. It tinges the saliva yellow.

Constituents.—Chrysophanic acid, tannin, etc.

Medicinal Uses.—Alterative, tonic, slightly astringent, and depurative. Has been employed in *chronic cutaneous troubles;* in *syphilitic, scrofulous,* and *rheumatic affections;* and also in *hepatic* and *dyspeptic ailments.* Externally a decoction is occasionally used in various *skin diseases, glandular swellings,* etc.

Dose.—Two to five (30 to 75 grains), best given as fluid extract.

Fig. 451.—Rumex Crispus, natural size.

RUMICIS EXTRACTUM.

Extract of Rumex Crispus.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Yellowish-brown.

Dose.—0.05 to 0.3 gram (1 to 5 grains) three times a day.

RUMICIS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Rumex.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the menstruum. Pack it tightly in a cylindrical per-

colator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

FIG. 452.—Leaf of Rue, natural size.

Ruta.

RUE.

Rutæ Folia.

Origin.—*Ruta graveolens*, Linné (*Rutaceæ*).

Habitat.—Europe.

Part used.—The leaves.

Description.—See figure. The leaves are bright green, smooth, pellucid-punctate. Odor aromatic, balsamic; taste bitter, acrid.

Constituents.—Volatile oil, resin, rutin, etc.

Medicinal Uses.—Stimulant, carminative, and anthelmintic. In large doses it is emmenagogue, and formerly much used in *menstrual disturbances* and *hysteria.*

Dose.—One to two grams (15 to 30 grains).

RUTÆ EXTRACTUM.

EXTRACT OF RUE.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.50 gram (2 to 8 grains).

RUTÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF RUTA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Rutæ Oleum; U. S.

OIL OF RUE.

Rutæ Ætheroleum — Volatile Oil of Rue.

Description.—See the Pharmacopœia, page 242.

Dose.—Two to four drops.

Sabadilla.

CEVADILLA.

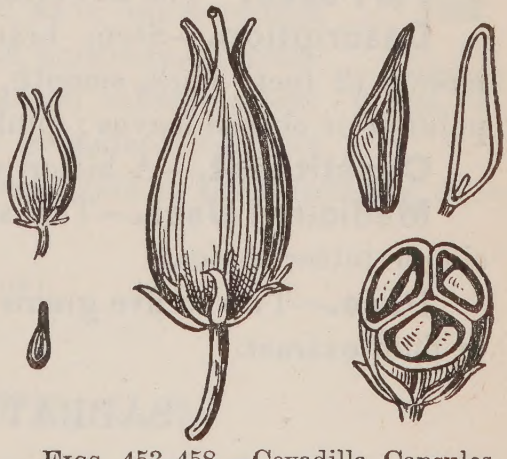
Sabadillæ Semina—Sabadillsamen, Läuse-körner, G.; *Cévadille,* F.; *Sabadilla, Husarfrö,* Sw.

Origin.—*Asagræa officinalis,* Lindley (*Melanthaceæ*).

Habitat.—Mexico and Central America.

Part used.—The seeds.

Description.—The drug consists of opened and unopened seed-capsules, or follicles, as well as of the seeds. The fruit consists of three brownish, thin follicles, adhering to each other at the base, and each containing from one to six seeds. The seeds are from five to six millimeters (⅕ to ¼ inch) long, and about two millimeters (1/12 inch) thick, pointed, angular, finely wrinkled lengthwise, glossy brownish-black. The skin is thin and envelops a white kernel. The seeds, which alone contain the active constituent, are inodorous, but have an acrid, persistent, bitter taste. The powder causes violent sneezing. The capsules should be rejected and the seeds alone used.



FIGS. 453–458.—Cevadilla Capsules, natural size and enlarged, transverse section, enlarged; seed, natural size and enlarged, and longitudinal section, enlarged.

Constituents.—The drug contains three alkaloids called *veratrine,*

cevadine, and *cevadilline*. Cevadine is crystalline, the other two amorphous. The alkaloids are combined with *cevadic* and *veratric acids*.

Uses.—The seeds are poisonous. The action depends on the alkaloid veratrine which they contain. They are seldom employed internally, but if given in nervous diseases, *neuralgia*, *sciatica*, and *heart diseases*, exert the action of veratrine. Externally an ointment of the seeds has been employed as a parasiticide to destroy lice and other vermin and as a cure for *itch*.

Dose for internal use, 0.05 to 0.25 gram (1 to 4 grains).

SABADILLÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF CEVADILLA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.20 cubic centimeter (1 to 3 minims).

Sabbatia.

SABBATIA.

Sabbatiæ Herba—American Centaury, Red Centaury.

Origin.—*Sabbatia angularis* and *Sabbatia paniculata*, Pursh (*Gentianaceæ*).

Habitat.—The United States.

Part used.—The flowering plant.

Description.—Stem branched, quadrangular, about sixty centimeters (2 feet) high, smooth, with opposite, clasping, oblong or linear, pointed or obtuse leaves ; pink flowers. Odor, none ; taste, bitter.

Constituent.—A bitter principle.

Medicinal Uses.—The same as of columbo, gentian, and other simple bitter tonics.

Dose.—Two to five grams (30 to 75 grains), best given in infusion or fluid extract.

SABBATIÆ EXTRACTUM.

EXTRACT OF SABBATIA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

SABBATIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF SABBATIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

Sabina; U. S.

SAVIN.

Sabinæ Ramuli—Savin Tops.

Origin.—*Juniperus Sabina*, Linné (*Coniferæ*).

Habitat.—Northern Asia, Europe, and America.

Part used.—The tops of the smaller branches, collected in the spring.

Description.—See the Pharmacopœia, page 285. Must have a good green, not brown, color.

FIG. 459.—Juniperus Sabina, enlarged.

Constituents.—Volatile oil, about two per cent.; also resin and tannin.

Medicinal Uses.—Gastro-intestinal irritant, with a probable tendency to stimulate the uterine functions. Used in atonic conditions of the uterine organs, as in *amenorrhœa* and *dysmenorrhœa*. In large doses it is poisonous, producing serious and often fatal gastro-intestinal inflammation. Externally it is sometimes employed to stimulate *indolent ulcers*, promote suppuration, and as a parasiticide in some forms of *skin disease*, as in *eczema*, *psora*, etc.

Dose.—0.3 to 1.5 gram (5 to 20 grains).

SABINÆ CERATUM; U. S.

SAVIN CERATE.

Melt thirty grams (1 ounce) resin cerate on a water-bath; then add nine cubic centimeters (150 minims) fluid extract of savin, and continue to heat the mixture with stirring until the alcohol has been driven off. Then remove the mixture from the heat, and stir it until cool.

About identical in strength with the preparation of 1870.

SABINÆ EXTRACTUM.

EXTRACT OF SAVIN.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Greenish-brown.

Dose.—0.06 to 0.3 gram (1 to 5 grains) several times a day.

SABINÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF SAVIN.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and twenty-five grams (about 5⅕ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.3 to 1.5 cubic centimeter (5 to 20 minims).

Sabinæ Oleum; U. S.

OIL OF SAVIN.

Sabinæ Ætheroleum — Volatile Oil of Savin.

Description.—See the Pharmacopœia, page 242.

Dose.—About five drops.

This oil is sometimes used as an abortifacient, but it should be borne in mind that any dose large enough to produce such an effect will probably produce death from gastro-intestinal inflammation.

Saccharum; U. S.

SUGAR.

Saccharum Album—Zucker, Rohrzucker, G.; *Sucre, Sucre de Canne*, F.; *Azucar*, Sp.; *Socker*, Sw.; *Cane-sugar, Refined Sugar, White Sugar, Sucrose.*

Origin.—*Saccharum officinarum*, Linné (*Graminaceæ*).

Habitat.—Cultivated in tropical and sub-tropical climates.

Description.—See the Pharmacopœia, page 285.

The best cut sugar and standard granulated sugar (free from ultramarine) are the only kinds that should be used in pharmacy. Must be perfectly dry and odorless. Sometimes granulated as well as crushed sugar is colored with ultramarine to overcome any yellowish tint arising from imperfect purification. As ultramarine contains sulphur, this impurity is very mischievous in pharmacy (see Syrupus).

When carefully heated to 160° C. (320° F.), so as to fuse, it becomes amorphous, hard, glassy in fracture, and is then called candy; this gradually becomes crystalline again. At between 210° and 220° C. (410° and 428° F.) it emits empyreumatic fumes and is converted into a brown, amorphous, hygroscopic, bitter substance called *caramel* ("burnt sugar").

Cane sugar, or some derivative of it, combines more or less perfectly with several of the metals. Thus we have a soluble combination of lime and sugar, and also a soluble saccharated oxide of iron. This accounts for the sometimes unexpected presence of iron, earth metals, etc., in liquids containing sugar. Syrup contained in an imperfectly tinned iron vessel becomes brown from ferric oxide. Possibly these saccharine solutions of metals are true saccharates. When sugar is gently heated (at not over 50° C., or 122° F.) with nitric acid of about 1.20 to 1.30 specific gravity, saccharic acid ($C_6H_{10}O_8$) is formed.

Strong nitric acid forms, with sugar or syrup, explosive *nitro-saccharose.* Sugar triturated with potassium chlorate is apt to cause the latter to explode; the mixture will at once explode on the addition of a drop of strong sulphuric acid. Sugar is readily soluble in water. At 0° C. (32° F.) one hundred pounds of water dissolves one hundred and eighty pounds sugar; at 15° C. (59° F.) the same quantity of water will dissolve one hundred and ninety-five pounds sugar; at 50° C. (122° F.) it dissolves two hundred and fifty-five pounds; and at 100° C. (212° F.) four hundred and seventy-one pounds. When sugar is thus dissolved in water, contraction takes place, which reaches its maximum when the solution contains 56.25 per cent. sugar. A solution of at least an equal

weight of sugar in water may be called a syrup. Most medicinal syrups, however, contain nearly two-thirds sugar.

Sugar is practically insoluble in absolute alcohol. A strong syrup when mixed with alcohol deposits crystals of sugar. An alcohol of seventy per cent. (by weight) strength dissolves two-fifths of its weight of sugar at 40° C. (104° F.), and a trifle over half that quantity at 14° C. (57.2° F.). But a ninety per cent. strength (by weight) alcohol dissolves only one-fortieth of its weight of sugar at 40° C., and only one one-hundred-and-sixtieth at 14° C. Thus when the alcoholic liquid is comparatively less strong it dissolves more sugar than the water contained in it can alone dissolve ; but when stronger the alcohol prevents the solution of a portion of the sugar, which in its absence would dissolve in the water alone.

Sucrose does not ferment, but it may be changed into glucose (grape sugar) by various means or causes, and the glucose readily undergoes fermentation.

Varieties of Sugar.—The official white sugar is *cane sugar* (*sucrose*, made from the sugar-cane), purified or "refined."

Grape sugar is a fermentable sugar (*glucose*) obtained from raisins and numerous other fruits ; it is also contained in honey. At present it is prepared artificially from starch by treating the latter with dilute sulphuric acid at a high temperature ; the grape sugar thus obtained is called *glucose*, and is manufactured on a large scale. The term "glucose" is in this country applied to the strong syrupy solution of grape sugar which is used in large quantities both as "syrup" and for making the dry "grape sugar." The dry, granular, or semi-crystalline grape sugar or glucose is used as an admixture to cheap grades of sugar (brown and golden sugars) for domestic purposes. While it is much less sweet than cane sugar, it is quite as wholesome and considerably cheaper.

Fruit sugar is a non-crystallizable sugar found in many fruits. It is contained in the liquid portion of honey after the separation of the granular grape sugar.

Maple sugar is sucrose obtained from the juice of the sugar maple (*Acer saccharinum*) by boiling it down to the point of crystallization. *Maple syrup* is a concentrated solution of maple sugar.

Sorghum syrup and *sorghum sugar* are obtained from the juice of sorghum corn, or Chinese corn (*Sorghum saccharinum*) in about the same manner as maple syrup and maple sugar are obtained from the juice of the sugar maple. When sorghum sugar can be refined and crystallized on a sufficiently economical scale white sugar will be cheapened and a great industry developed.

Beet sugar, from *Beta vulgaris*, var. *cicla*, and other varieties of the

beet, is also a variety of sucrose, which, when well refined, cannot be distinguished from the cane sugar.

Table of strengths as shown by specific gravities of solutions of pure white sugar in water at 17.5° C. (63.5° F.):

Specific Gravity.	Per Cent. Sugar.	Specific Gravity.	Per Cent. Sugar.
1.0040	1	1.2057	45
1.0200	5	1.2165	50
1.0404	10	1.2610	55
1.0614	15	1.2900	60
1.0832	20	1.3190	65
1.1059	25	1.3507	70
1.1295	30	1.3824	75
1.1540	35	1.4159	80
1.1794	40		

Uses.—Sugar is nutritious and in large quantities slightly laxative. It is not employed as a medicine, but as a condiment or excipient. It is antiseptic and is used for preparing and preserving various pharmaceutical preparations.

Sacchari Syrupus Fuscus.

Molasses.

Theriaca—Treacle.

A brown syrup of about 1.40 specific gravity, obtained in the process of manufacturing and refining cane sugar. It has a slightly acid reaction, but should not be fermenting. Odor slight, sweetish; taste very sweet. When long boiled it becomes hard on cooling ("taffy"). Should be perfectly clear.

Used as an excipient.

Saccharum Lactis; U. S.

Milk Sugar.

Lactosum—Lactose; Milchzucker, G.; *Sucre de lait*, F.; *Azucar de leche, Lactosa*, Sp.; *Mjölksocker*, Sw.; *Sugar of Milk.*

Milk sugar is *lactose*—"a peculiar crystalline sugar" contained in cow's milk, obtained by evaporating the whey, and purified by recrystallization.

Description.—See the Pharmacopœia, page 286.

The powder should be perfectly white, have a neutral reaction, and no odor.

It is manufactured almost exclusively in the cantons Berne and Luzerne, Switzerland, from the whey remaining after making cheese.

It is **used** in medicine and pharmacy only in powder as a diluent of active remedies in a pulverulent form, being serviceable chiefly on account of its great hardness and slow solubility in water.

Sago.

SAGO.

Origin.—*Metroxylon Sagus*, Koenig; *Arenga saccharifera*, Labill, and other allied palms.

Habitat.—Indian Archipelago.

Drug.—The prepared starch from the interior of the stem.

FIG. 460.—Sago Starch.

Description.—Hard spherical grains about the size of a pin's head, whitish, with a slight brownish-yellow or pinkish tint, and usually more or less translucent. Ordinarily somewhat darker on one side. Odorless; taste insipid.

Forms a gelatinous mass with boiling water.

Varieties.—*Pearl Sago* is the finest and whitest. Next comes *Brown Sago*, of inferior quality and darker color. An artificial "sago" is made from potato starch.

Constituents.—It is all starch.

Uses.—Only as food. Being easily digested and quite palatable it is often used in the sick-room.

Salep Tubera.

SALEP.

Origin.—Several species of *Orchis*, and other plants of the natural order *Orchidaceæ*, especially of the sub-order *Ophrydeæ*.

Habitat.—Germany and France.

Part used.—The new tubers formed during the year in which they

are collected, the collection of them taking place in the autumn. They are deprived of the epidermis and dried.

Description.—Irregularly oval, globular, or flattened roundish tubers; hard, heavy; translucent, with a bright yellowish or yellowish-gray color; fracture homogeneous, horny, shining; odorless; taste insipid, mucilaginous.

Constituents.—About forty-eight per cent. *bassorin* (or vegetable mucilage), and twenty-seven per cent. *starch*. Powdered salep forms, with forty times its weight of boiling water, a thick jelly.

Medicinal Uses.—Nutritive and demulcent. A mucilage made from salep is occasionally employed as a vehicle for acrid or irritating remedies.

SALEP MUCILAGO.

SALEP MUCILAGE.

Put three grams (46 grains) powdered salep and thirty cubic centimeters (1 fluidounce) cold water in a pint bottle, and immediately shake briskly until thoroughly mixed. Then add two hundred and seventy cubic centimeters (9 fluidounces) boiling water, and continue shaking the mixture until cold. Finally strain.

Salicinum; U. S.

SALICIN.

Origin, Description, etc.—See the Pharmacopœia, page 286. It is a glucoside, in white, shining crystals, odorless, but having a very bitter taste.

Medicinal Uses.—Has been used as an antiperiodic and bitter tonic in the same manner as quinine. It is less active and reliable. Lately it has been used like salicylic acid in *acute rheumatism*.

Dose.—One to two grams (15 to 30 grains), repeated several times a day.

Salix; U. S.

SALIX.

Salicis Cortex— Willow Bark.

Origin.—*Salix alba* Linné, and other species of *Salix* (*Salicaceæ*).

Habitat.—Europe and America.

Part used.—The bark.

Description.—See the Pharmacopœia, page 286.

Should be very bitter.

Constituents.—The most important one is *salicin;* it also contains *tannin.*

Medicinal Uses.—Its action depends on salicin, to which is added the effect of tannic acid. It is therefore an astringent bitter tonic and antiperiodic.

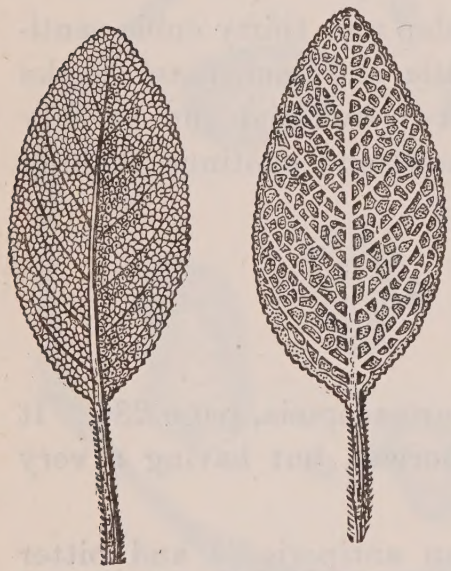
Dose.—Two to five grams (30 to 75 grains), best given in infusion.

Salvia; U. S.

SALVIA.

Salviæ Folia—Salbeiblätter, G.; *Sauge officinale,* F.; *Salvia,* Sw.; *Sage.*

Origin.—*Salvia officinalis,* Linné (*Labiatæ*).



FIGS. 461, 462.—Sage Leaf, upper and lower surface.

Habitat.—Cultivated.

Part used.—The leaves.

Description.—They are white or grayish-green, thick, wrinkled; soft, hairy, and glandulous on the under side; aromatic, bitter, somewhat astringent. Wild, gray, thick-hairy sage is the best ("Italian Sage").

Constituents.—Volatile oil, from one-half to three-fourths per cent.; and some tannin, resin, etc.

Medicinal Uses.—Stimulant, tonic, astringent, vulnerary. Infusion of sage with alum is a very popular gargle in *sore throat, relaxed uvula,* etc.

Dose.—Two to five grams (30 to 75 grains) in infusion, or as FLUID EXTRACT made with diluted alcohol as a menstruum.

SALVIÆ INFUSUM.

INFUSION OF SAGE.

From fifteen grams (about ½ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms).

Sambucus; U. S.

SAMBUCUS.

Sambuci Flores — Fliederblumen, Hollunderblüthen, G.; *Fleurs de sureau*, F.; *Fläderté*, Sw.; *Elder-Flowers.*

Origin.—*Sambucus canadensis*, Linné (*Caprifoliaceæ*).

Habitat.—North America.

Part used.—The flowers.

Description.—Cream-colored or pale-yellow, very small, having a peculiar fragrant odor and a sweetish, mucilaginous, aromatic, finally somewhat acrid taste.

Must be light colored, sound, and of good odor.

The European elder-flowers, from *Sambucus nigra*, Linné, resemble closely the American.

Constituents.—A very small quantity of volatile oil having the odor of the drug in a high degree. Also some acrid resin, valerianic acid, and mucilage.

Medicinal Uses.—Stimulant, diaphoretic.

Dose.—Two to four grams (30 to 60 grains). Best given as hot tea.

SAMBUCI EXTRACTUM.

EXTRACT OF ELDER-FLOWERS.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

SAMBUCI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF SAMBUCUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

SAMBUCI INFUSUM.

INFUSION OF ELDER-FLOWERS.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms). As a diaphoretic the hot infusion may be taken in considerably larger doses.

Sambuci Fructus.

ELDER-BERRIES.

The fruit of *Sambucus canadensis* (see Sambucus).

Small, globular, purple, fleshy, juicy berries.

Constituents.—Fruit acids, valerianic acid, sugar, pectin, traces of volatile oil, etc.

Medicinal Uses.—Diaphoretic and aperient. "Elder-berry jam" is often used as a laxative in fevers by the country population.

Dose of the inspissated juice, five to fifteen grams (60 grains to ½ ounce).

SAMBUCI SYRUPUS.

ELDER-BERRY SYRUP.

Roob Sambuci.

Carefully heat any desired quantity of fresh ripe elder-berries, stirring constantly, until they burst open. Express the juice. Set aside to settle during about a week. Strain. Weigh. Then evaporate it to the consistence of thin syrup. While still warm add sugar, in the proportion of one part for each twelve parts by weight of the juice employed.

Used like the inspissated juice.

Sandaraca.

SANDARAC.

Origin.—*Callitris quadrivalvis*, Ventenat (*Coniferæ*).

Habitat.—Northwestern Africa.

Description.—A resin which exudes spontaneously from incisions made through the bark of the tree and dries in the air. Long tears, pale yellow, covered with a light dust, transparent, brittle, not adhe-

sive when chewed. Odor and taste slightly terebinthinous. Soluble in hot alcohol.

Used for manufacturing varnishes. Cotton saturated with a strong solution of sandarac in ether is often used for temporarily plugging decayed teeth.

Sanguinaria; U. S.

SANGUINARIA.

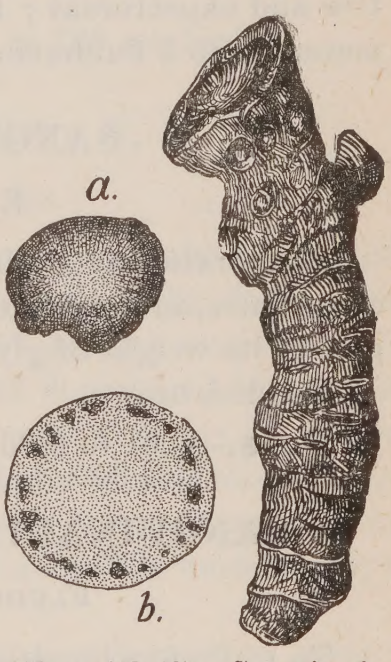
Sanguinariæ Rhizoma—Bloodroot.

Origin.—*Sanguinaria canadensis*, Linné (*Papaveraceæ*).

Habitat.—North America.

Part used.—The rhizome collected in the autumn.

Description.—See the Pharmacopœia, page 287. The powder is extremely irritating to the air-passages.



FIGS. 463–465.—Sanguinaria, whole, natural size, large specimen. *a*, transverse section of soaked rhizome; *b*, same, after soaking in dilute lye.

Constituents.—The alkaloid *sanguinarine*, which has been obtained in white or colorless crystals. Its salts are bright red, very acrid. One or two other alkaloids have been described as found in sanguinaria. Also resins, peculiar acids, etc.

Medicinal Uses.—When given in full medicinal doses bloodroot is an active emetic, causing depression and reducing the action of the heart. In excessive doses it is an irritant narcotic poison, producing severe gastro-intestinal inflammation, with intense thirst, prostration, vertigo, and collapse. In small doses this drug is stimulant and tonic. It is occasionally employed in *atonic dyspepsia*, *duodenal catarrh*, *catarrh* of the *biliary ducts* with *jaundice*, in *chronic nasal catarrh*, *bronchitis*, *asthma*, *amenorrhœa*, and as an alterative in *syphilis*, etc.

Dose.—0.1 to 1.5 gram (2 to 20 grains), according to the effect it is desired to obtain.

SANGUINARIÆ ABSTRACTUM.

ABSTRACT OF SANGUINARIA.

Prepared from fluid extract of sanguinaria in the same manner as the abstract of coto is obtained from the fluid extract of coto.

Dose.—0.05 to 0.6 gram (1 to 10 grains).

SANGUINARIÆ ACETUM; U. S.

VINEGAR OF SANGUINARIA.

Moisten thirty grams (1 ounce 25 grains) sanguinaria, in No. 30 powder, with one hundred and fifty cubic centimeters (5 fluidounces) diluted acetic acid ; pack it firmly in a glass percolator, and percolate with diluted acetic acid until three hundred grams (10 ounces 255 grains, or about 9 fluidounces) of percolate has been obtained.

This preparation is about one-fifth weaker than that of the Pharmacopœia of 1870, and the dose of the new vinegar should therefore be twenty-five per cent. larger.

Dose.—1 to 2.50 cubic centimeters (15 to 40 minims) as an alterative and expectorant ; the emetic dose is eight to twenty cubic centimeters (2 to 5 fluidrachms).

SANGUINARIÆ EXTRACTUM.

EXTRACT OF SANGUINARIA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Reddish-brown.

Dose.—0.01 to 0.06 gram ($\frac{1}{6}$ to 1 grain).

SANGUINARIÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF SANGUINARIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and fifty grams (about 6$\frac{1}{4}$ fluidounces) of the *menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14$\frac{1}{3}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

This fluid extract is never free from sediment, which deposits on the bottom and sides of the containing vessel.

Dose.—0.5 to 1 cubic centimeter (8 to 15 minims).

SANGUINARIÆ SYRUPUS.

SYRUP OF SANGUINARIA.

Mix thirty cubic centimeters (1 fluidounce) fluid extract of sanguinaria with two hundred and seventy cubic centimeters (9 fluidounces) simple syrup.

It is sometimes prepared by dissolving five hundred grams (17⅔ avoirdupois ounces) sugar in three hundred cubic centimeters (10 fluidounces) vinegar of sanguinaria.

Dose.—One to four cubic centimeters (15 to 120 minims).

SANGUINARIÆ TINCTURA; U. S.

TINCTURE OF SANGUINARIA.

Mix two hundred grams (7 ounces 24 grains, or about 8⅓ fluidounces) alcohol and one hundred cubic centimeters (3⅓ fluidounces) water. Moisten forty-five grams (1 ounce 257 grains) sanguinaria, in No. 60 powder, with thirty cubic centimeters (1 fluidounce) of the mixture; macerate for twenty-four hours; then pack it firmly in a cylindrical percolator and percolate with the remainder of the mixture, and as much more menstruum of the same kind as may be necessary to obtain three hundred grams (10 ounces 255 grains, or about 11½ fluidounces) of final product.

Tincture of sanguinaria is deep red. It always deposits a layer of reddish-brown sediment on the sides and bottom of the bottle containing it.

Used mainly as an expectorant in **doses** of 0.5 to 4 cubic centimeters (8 to 60 minims).

Santalum Citrinum.

YELLOW SANTALWOOD.

Yellow Sandalwood.

Origin.—*Santalum Freycinetianum*, M. Gaudichaud (*Santalaceæ*).

Habitat.—The Sandwich and Feejee Islands, etc.

Part used.—The wood.

Description.—Hard, heavy, yellowish chips; odor agreeably aromatic; taste aromatic, somewhat bitter.

Constituent.—An aromatic volatile oil.

White Santalwood, from *Santalum album*, Linné, is also used for the same purposes as the yellow santalwood, but is less common in the trade.

Uses.—It is employed in China as an ingredient of incense used in the temples. Its oil is used for the same purposes as copaiba, and a FLUID EXTRACT, made with alcohol as a menstruum, has been employed in the same manner.

Dose of the fluid extract, five to ten cubic centimeters (1 to 2½ fluidrachms).

Santali Oleum; U. S.

OIL OF SANTAL.

Santali Ætheroleum—Volatile Oil of Santal, Oil of Sandalwood.

Origin.—*Santalum album*, Linné (*Santalaceæ*).

Habitat.—East India.

Description.—See the Pharmacopœia, page 242.

Medicinal Uses.—Stimulant blennorrhetic in *gonorrhœa*, *gleet*, etc.

Dose.—Ten to twenty-five drops. Usually given in closed gelatin capsules, or in the form of emulsion prepared like copaiba mixture.

Santalum Rubrum; U. S.

RED SAUNDERS.

Santalini Lignum.

Origin.—*Pterocarpus santalinus* Linné (*Leguminosæ*).

Habitat.—East India.

Part used.—The heart-wood.

Description.—See the Pharmacopœia, page 287.

Usually occurs in raspings.

Constituent.—Red coloring matter of a resinous acid character, and called *santalic acid*, which is soluble in alcohol but insoluble in water.

Uses.—For coloring alcoholic liquids red. It does not yield its coloring matter to water.

SANTALI RUBRI TINCTURA.

TINCTURE OF RED SAUNDERS.

Moisten one hundred grams (3 ounces 230 grains) powdered red saunders with alcohol; pack it tightly in a cylindrical percolator, and percolate with alcohol until three hundred and sixty cubic centimeters (12 fluidounces) tincture has been obtained.

Santonica; U. S.

SANTONICA.

Santonicæ Flores, Semina Cinæ — Wurmsamen, Zittwersamen, G.; *Barbotine, Semencine*, F.; *Maskfrö*, Sw.; *Levantic Wormseed, German Wormseed.*

Origin.—*Artemisia maritima*, var. *Stechmanniana*, Besser (*Compositæ*).

Habitat.—Turkestan.

Part used.—The unexpanded flower-heads.

Description.—Oblong grayish-green or greenish-yellow flower-heads, about two millimeters ($\frac{1}{12}$ inch) long, covered with glandular

FIGS. 466–471.—Artemisia Vahliana. *a*, whole; *b*, longitudinal section; *c*, inner surface of scale; *d*, floret; all enlarged. Artemisia Cina. *e*, natural size and enlarged; *f*, inner surface of a scale.

scales and containing from three to five undeveloped florets. Odor strong, peculiar, aromatic; taste bitter, aromatic, leaving a somewhat cooling sensation in the mouth.

Constituents.—About one per cent. *volatile oil* and from one and one-half to two and one-third per cent. *santonin* (santonic acid).

Test.—A brownish color indicates that the drug is old and damaged. Must have a greenish color and strong odor.

Uses.—Much employed as a vermifuge for round worms (lumbrici). The powder is usually given in syrup or honey.

Dose.—One to five grams (15 to 75 grains) three times a day, followed or accompanied by some purgative.

SANTONICÆ EXTRACTUM.

EXTRACT OF SANTONICA.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Greenish-brown.

Dose.—0.10 to 0.50 gram (2 to 8 grains).

SANTONICÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF SANTONICA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Santoninas Sodii; U. S.

SANTONINATE OF SODIUM.

A white crystallized compound which is very sensitive to light, and ought to be kept in tightly corked amber bottles.

Description and Tests.—See the Pharmacopœia, page 302.

Medicinal Uses.—Anthelmintic.

Dose.—0.3 to 0.6 gram (5 to 10 grains).

SANTONINATIS SODII TROCHISCI; U. S.

TROCHES OF SANTONINATE OF SODIUM.

Triturate together 6.50 grams (100 grains) santoninate of sodium, one hundred and thirty grams (2,000 grains) finely powdered sugar, and 3.25 grams (50 grains) powdered tragacanth. Add sufficient orange-flower water and form a mass to be divided into one hundred troches.

Keep the product in amber bottles.

Santoninum; U. S.

SANTONIN.

A white crystalline substance obtained from santonica. It has weak acid properties, and is frequently called *santonic acid* (see Santoninas Sodii).

Description.—See the Pharmacopœia, page 288. It is looked upon as an anhydride of santonic acid. When exposed to light it becomes yellow, and undergoes chemical change.

Should therefore be kept in amber-colored bottles, tightly corked.

Must consist of small, perfectly white crystals.

Medicinal Uses.—In medicinal doses it is anthelmintic. Occasionally it exerts a peculiar effect on the sight, as if the patient viewed everything through a yellow glass. This effect is usually of a tempo-

rary nature. In excessive doses santonin may produce symptoms of poisoning accompanied by gastro-intestinal irritation.

Dose.—0.05 to 0.25 gram (1 to 4 grains); less for children.

Sapo; U. S.

SOAP.

Sapo Durus—Seife, G.; *Savon*, F.; *Jabon, Jabon de Sosa, Jabon blanco, Jabon duro*, Sp.; *Tvål*, Sw.; *White Castile Soap.*

Description.—See the Pharmacopœia, pages 288 and 289.

White hard soap prepared from olive-oil and caustic soda.

All hard soaps are soda soaps. The soft soaps are potash soaps. Nearly all soaps are oleates, or palmitates, or both, of sodium or potassium, or both.

The soap intended by the Pharmacopœia is a pure olive-oil soda soap, which is well represented by so-called "pure white castile soap."

Must be white, hard, firm; free from crystalline efflorescence on the surface, and free from rancidity. It dissolves completely, though not forming a clear solution, in water and in diluted alcohol. Its odor is peculiar, not unpleasant, and when once familiar affords a good sign by which to judge of the quality of the article. On exposure to dry air it should become dry and hard. A castile soap that "sweats" or becomes moist or greasy on exposure is of very poor quality.

Much of the castile soap sold in this country is adulterated or loaded with barium sulphate, etc.

The best grades come from Spain.

Good castile soap can be dried at a temperature not to exceed 40° C. (104° F.) and powdered.

Uses.—Soap is a laxative when given internally. Externally it is often employed as a stimulant and discutient. Ointments containing soap promote suppuration when applied to raw or granulating surfaces, and a mixture of sugar with ordinary yellow soap is often used for this purpose.

In the form of liniment soap is useful in *sprains* and *bruises*.

Soapsuds, with or without castor-oil, forms an effective laxative enema.

Suppositories made of yellow soap are also of value as laxatives.

Soap in solution is an accessible remedy to be used as an antidote in poisoning by mineral acids, and should always be promptly employed unless more effective antacids are at hand.

Dose.—0.3 to 1 gram (5 to 15 grains), in pill.

SAPONIS CERATUM; Phar. 1870.

Soap Cerate.

Melt together sixty grams (2 ounces) soap plaster and seventy-five grams (2½ ounces) yellow wax; then add one hundred and twenty grams (4 ounces) of olive-oil. Stir until cool.

Not in the new Pharmacopœia.

Used to allay irritation and inflammation.

SAPONIS CERATI EMPLASTRUM.

Soap Cerate Plaster.

Dissolve one hundred and fifty grams (5 ounces) oxide of lead in one hundred and eighty grams (6 fluidounces) acetic acid by the aid of heat. Then add one hundred grams (3½ ounces) powdered white soap, and boil the mixture until the moisture is nearly evaporated; finally add one hundred and twenty grams (4 ounces) yellow wax and one hundred and eighty grams (6 ounces) olive-oil. Stir constantly, continuing the heat until the plaster thickens properly on cooling.

This formula affords a product identical with that of the British Pharmacopœia.

SAPONIS EMPLASTRUM; U. S.

Soap Plaster.

Triturate thirty grams (1 ounce) dried white castile soap, in coarse powder, with enough water to form a smooth semi-liquid paste; then mix this with two hundred and seventy grams (9 ounces) lead plaster, previously melted, and evaporate the whole to a proper consistence.

Same as in 1870.

Old lead plaster is to be preferred to fresh for making soap plaster, as the fresh lead plaster makes the soap plaster sticky. Greater heat is required, too, for making this, than for the other plasters. Too much soap would make this plaster extremely tough.

To prevent abrasions, bed-sores, etc.

SAPONIS LINIMENTUM; U. S.

Soap Liniment.

Digest three hundred grams (or 10 ounces) soap, in shavings, in four hundred and twenty-five grams (about 14 fluidounces) of water until dissolved. Dissolve one hundred and fifty grams (5 ounces) camphor and

thirty grams (1 ounce) oil of rosemary in two thousand grams (70 ounces 240 grains, or about 83½ fluidounces) alcohol. Mix the two solutions and filter through paper, adding enough water through the filter to make the final product weigh three thousand grams (or 100 ounces, measuring about 100 fluidounces).

Nearly identical with the preparation of 1870.

Used in *sprains* and *bruises.*

Sapo Viridis; U. S.

GREEN SOAP.

Sapo Mollis.

A potash soap made with pure, *fresh* hempseed-oil, or with fresh, raw, cold-pressed linseed-oil.

Description.—See the Pharmacopœia, page 289.

Most of the soap sold as "German Soft Soap," or under the name of "Soft Soap" or "Green Soft Soap," is a very offensive, smeary, gelatinous mass. Good green soap contains from thirty-five to forty per cent. fat acids, from six to ten per cent. alkali, forty-five to fifty per cent. water, some glycerin, etc. Must not contain more than one per cent. soda, and should be entirely free from starch and from silicate of sodium. The consistence of good green soap is about like that of fresh butter; it is translucent, with a greenish-yellow color; and its odor is strongly soapy but not offensive.

Medicinal Uses.—Employed externally, either alone or in combination with other remedies, in some forms of *skin disease*, as *eczema*, *seborrhœa*, etc.

SAPONIS VIRIDIS TINCTURA; U. S.

TINCTURE OF GREEN SOAP.

Mix sixty-five grams (2 ounces 128 grains) green soap, two grams (31 grains) volatile oil of lavender, and thirty-three grams (1 ounce 72 grains, or about 1⅓ fluidounce) alcohol; let the mixture stand until the soap is dissolved, stirring it frequently to facilitate the solution. Then filter through paper, adding enough alcohol through the filter to make the total product weigh one hundred grams (3 ounces 230 grains, or about 3½ fluidounces).

Used externally for the same purposes as the green soap itself.

Sapo Animalis.

CURD SOAP.

White soda soap, made with purified solid animal fats, such as tallow. It is dry, hard, white, inodorous, slightly alkaline, not greasy, soluble in water and in diluted alcohol. It is composed of oleate and stearate of sodium.

Curd soap is the basis of all toilet soaps.

SAPONIS OPODELDOC.

STEER'S OPODELDOC.

Dissolve nine cubic centimeters (2½ fluidrachms) oil of peppermint, thirty cubic centimeters (1 fluidounce) oil of rosemary, and sixty grams (2 ounces) camphor in two thousand two hundred and seventy cubic centimeters (5 pints) alcohol. Dissolve four hundred and fifty-five grams (1 pound) curd soap in three hundred cubic centimeters (10½ fluidounces) water by the aid of heat. Mix the solutions and add three hundred cubic centimeters (10½ fluidounces) water of ammonia. Stir well until all is perfectly homogeneous; strain while hot, and pour it into opodeldoc bottles and cork these tightly. When cold the contents gelatinize.

A popular discutient in *sprains* and *bruises*.

FIG. 472.—Saponaria, root and rootlets, natural size.

Saponaria.

SAPONARIA.

Saponariæ Radix—Soapwort Root.

Origin.—*Saponaria officinalis*, Linné (*Caryophyllaceæ*).

Habitat.—Europe and America.

Part used.—The root.

Description.—Cylindrical, about twenty-five centimeters

(10 inches) long, three to twelve millimeters ($\frac{1}{8}$ to $\frac{1}{2}$ inch) in diameter, wrinkled longitudinally; externally dark brown, internally whitish; bark thick; inodorous; taste bitterish, afterward acrid. The smaller roots are to be preferred.

Constituents.—*Saponin*, resin, etc.

Medicinal Uses.—Saponaria has been used as an alterative diaphoretic in *chronic cutaneous diseases*, *rheumatism*, and *gout*. It is probable that this drug possesses active medicinal properties in common with senega, sarsaparilla, quillaia, and other drugs containing saponin, but it is not now used in medicine, but only in the arts, for washing silks, etc.

Dose.—About fifty grams ($1\frac{2}{3}$ ounce) daily, in infusion.

Sarsaparilla; U. S.

SARSAPARILLA.

Sarsaparillæ Radix, *Sarsæ Radix*—*Sassaparille*, G.; *Salsepareille*, F.; *Zarzaparilla*, Sp.; *Sarsaparill*, Sw.

Origin.—*Smilax officinalis*, Kunth; *Smilax medica*, Schlechtendal et Chamisso; *Smilax syphilitica*, Kunth; and probably also other species of *Smilax*.

Habitat.—Mexico, Central America, Brazil.

Part used.—The roots.

Description.—See the Pharmacopœia, page 289.

General Description.—Long and slender, sometimes over two meters (about 80 inches) long, and usually about five millimeters ($\frac{1}{5}$ inch) in diameter; shrivelled nearest the rhizome ("chump"), coarsely wrinkled lengthwise; inodorous; taste somewhat mucilaginous, bitter, afterward acrid.

Varieties.—The principal varieties of sarsaparilla are the Honduras, the Para (Brazilian, Rio Negro or Lisbon sarsaparilla), the Mexican (Vera Cruz or Tampico), and the Jamaica sarsaparilla.

FIG. 473.—Bundle of Honduras Sarsaparilla, ¼ linear size.

In the United States all these varieties are used except the Jamaica sarsaparilla. The Para sarsaparilla is not used to any great extent as compared with the Honduras and the Mexican. Owing to its cheapness the Mexican sarsaparilla is used more than all the rest together; but the Honduras sarsaparilla is the one generally esteemed in this country as the best, though Para sarsaparilla is preferred by some unquestionably competent judges. Jamaica sarsaparilla is preferred in England, where that is the only kind officially recognized.

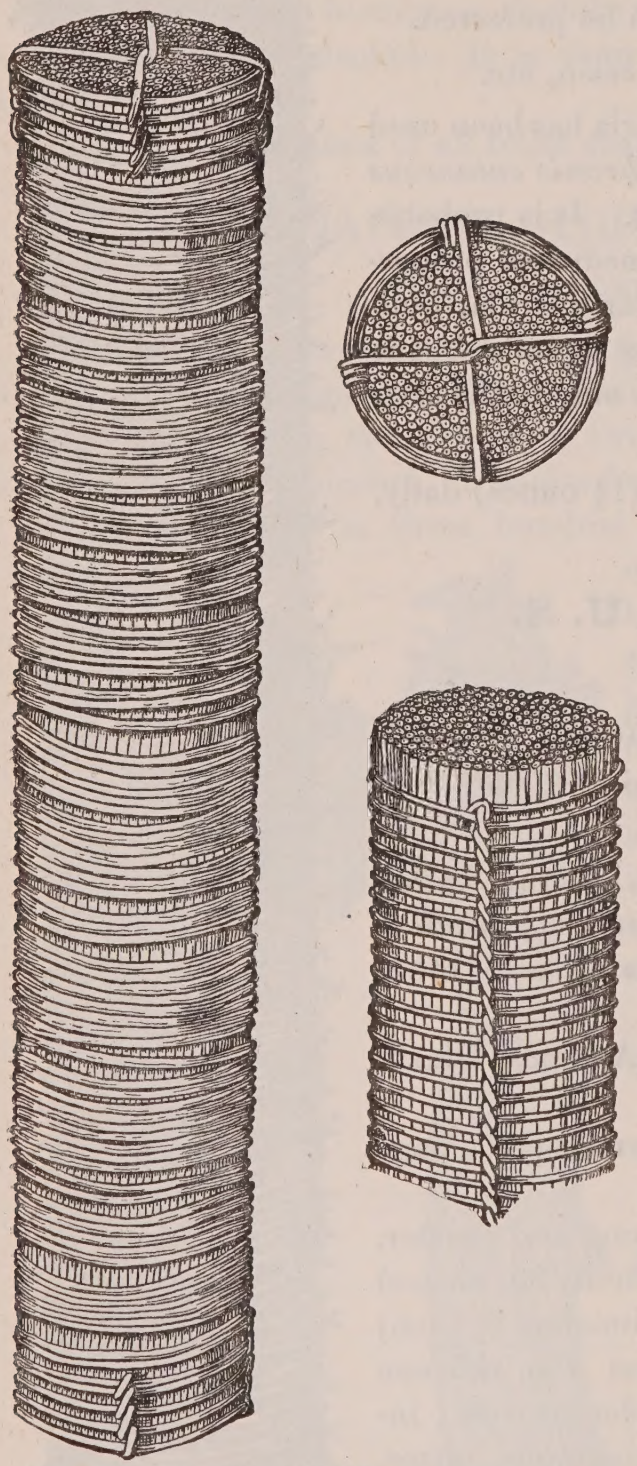


FIG. 474.—Bundle of Rio Negro Sarsaparilla, reduced.

Sarsaparillas are generally classified into: 1, *mealy sarsaparillas*, in which the parenchyma cells most frequently contain unaltered starch granules, but occasionally a pasty mass (altered starch?); and 2, *non-mealy sarsaparillas*, in which the parenchyma cells most frequently contain a pasty mass (altered starch?), but occasionally unaltered starch granules.

This classification does not seem to have any substantial value, pharmacologically or otherwise, except in so far that a mealy or starchy sarsaparilla—be it Honduras, Para, Mexican, or any other—is probably a sounder drug than a non-mealy one. It is not improbable that all the sarsaparillas would be *mealy* if carefully cured, and that the "*non-mealy*" condition often met with in Mexican, and most frequently in Jamaica sarsaparilla, but occasionally also observed in the Honduras and Para sarsaparillas which are classed as *mealy*, is simply an alteration of the starch arising from careless curing, or exposure to heat,

or moisture, or both, or it may be that the roots are non-mealy only in those portions which are exposed or covered by only a very thin layer of earth in the growing plants. It is well known that the portions nearest the rhizome are almost invariably non-mealy and shrivelled, and that so-called non-mealy sarsaparillas are mostly mealy and plump in the portions farthest away from it. We are told that the natives, who collect the roots, sometimes lay bare a portion of them and leave their task unfinished, to return again at their convenience. As the digging is necessarily commenced at the rhizome, the portions of roots nearest to it will thus be left exposed until the work is finished.

Mealy sarsaparillas are plump, sound-looking, and have a thick peri-ligneous layer. They are preferred to other sarsaparillas in all countries except England. Honduras and Para sarsaparillas are the mealy kinds.

Non-mealy sarsaparillas, which include the Mexican and the Jamaica, are thin, shrivelled, with thick longitudinal wrinkles, and a thin peri-ligneous layer, and lack sound unaltered starch granules, having instead a horny appearance in the fracture.

Honduras Sarsaparilla.—Roots without the chumps. Brown, plump, wrinkles comparatively fine. Put up in bundles as seen in Fig. 473. The appearance of a transverse section is seen in Fig. 480, *b*.

Para Sarsaparilla.—Roots without the chumps. Dark brown. Peri-ligneous layer thick. Plump, and finely wrinkled. Bundle and section as seen in Figs. 474 and 479, *a*. It is usually very clean.

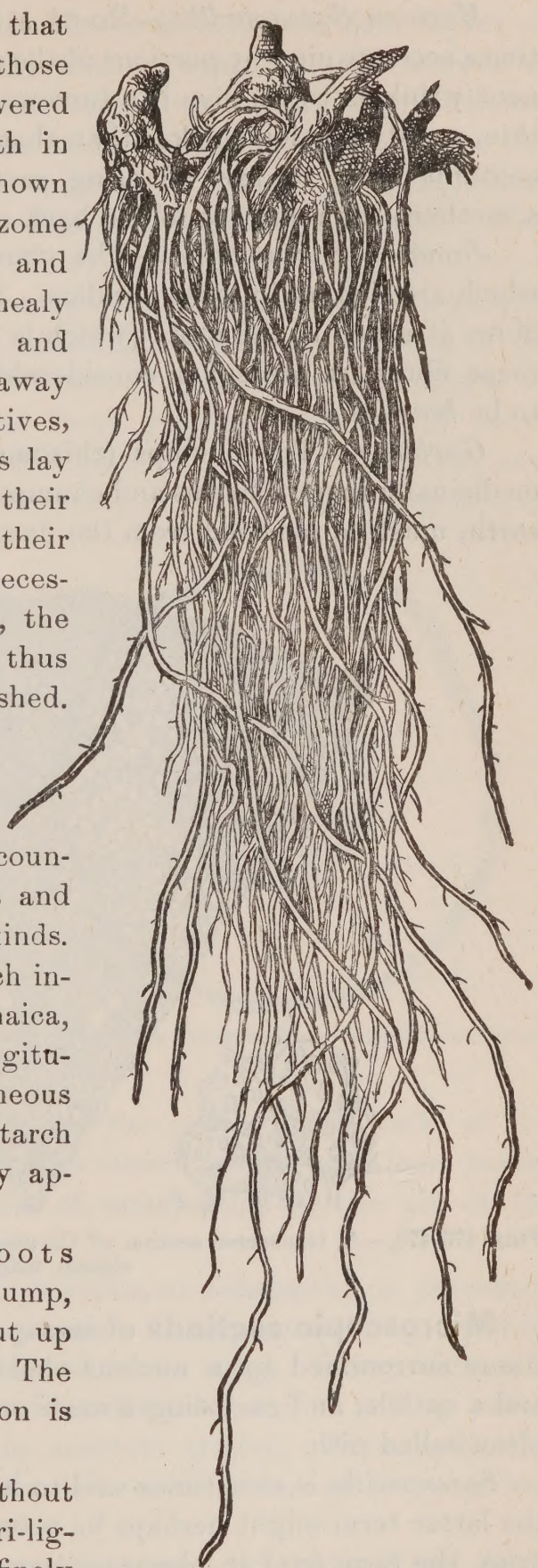
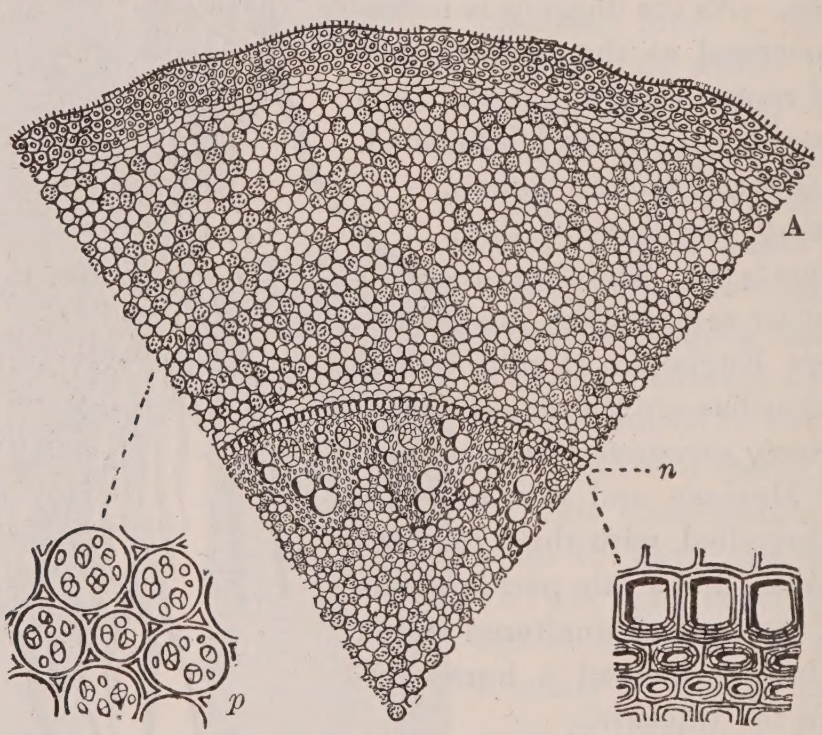


FIG. 475.—Mexican Sarsaparilla, one-sixth linear size.

Mexican Sarsaparilla.—Roots attached to the chumps, and sometimes accompanied by portions of the stems. Brownish-gray, with prominent wrinkles which give it a furrowed appearance. Peri-ligneous layer thin, woody portion thicker than that of any other sarsaparilla. Mostly contains more or less adhering earth. Not made up into bundles; sometimes the roots are folded back over the chumps. (See Fig. 475.)

Jamaica Sarsaparilla.—The chumps often accompany the roots, which are tied up in loose bundles. Reddish. Wrinkles heavy. Root-fibres attached to the roots (which is considered a good sign). When these fibres are present in considerable numbers the sarsaparilla is said to be *bearded.*

Garbling.—The chumps (rhizomes) are thick, woody, knotty, and medicinally inert. Stems and chumps, if present, and also any adhering earth, must be removed from the drug before using it.



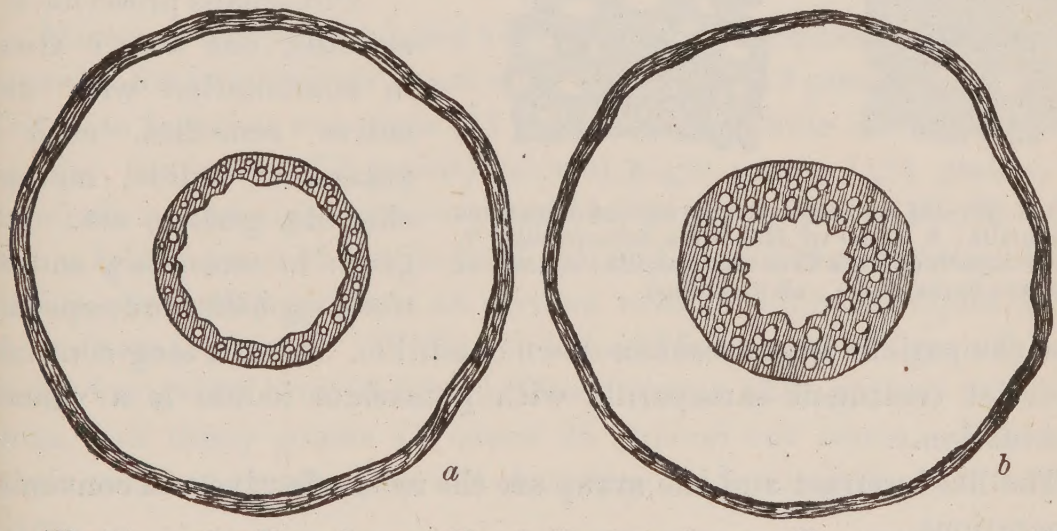
FIGS. 476–478.—A, transverse section of Caracas Sarsaparilla; *p*, parenchyma; *n*, nucleus sheath, magnified.

Microscopic sections of sarsaparilla roots show a circle of woody tissue surrounded by a nucleus sheath, a thick layer of parenchyma and a cuticle, and enclosing a more or less thick column of parenchyma often called pith.

Sarsaparilla is sometimes said to have a true bark and pith, but while the latter term might perhaps be properly employed in regard to this drug, the term *bark* in pharmacognosy should be restricted to the much more complex structure known as the *bark* (cortex) of plants having exogenous structure. (See article on Microscopic Structure of Plants.)

The peri-ligneous portion of sarsaparilla is divided into four layers of tissue, an external cuticle, generally missing except in the bottom of the wrinkles, and a subcuticular layer consisting of peculiarly thickened sclerenchyma cells, which together are sometimes (improperly, in our opinion) called the *external bark;* a layer of parenchyma, sometimes called *middle bark;* and the nucleus sheath, sometimes called *inner bark.* All of these structures are shown in Figs. 476–478.

According to Schleiden, sarsaparillas may be divided into two groups, those growing south of 10° north latitude, in which the diameter of the inner parenchyma is three to eight times as great as the thickness of the woody layer (Fig. 479, *a*), and those growing north of 10° north latitude, in which the diameter of the inner parenchyma is at most one-and-a-half times as great as the thickness of the woody layer (Fig. 480, *b*).

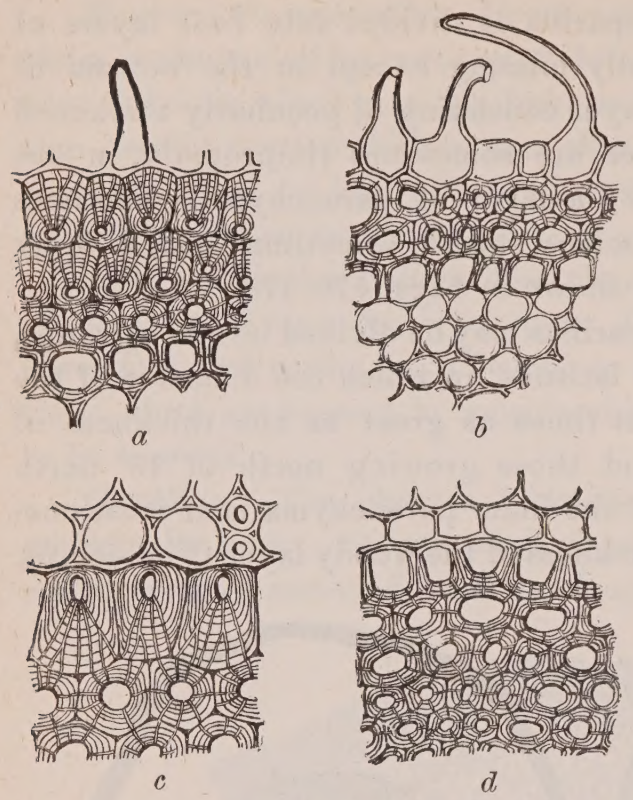


FIGS. 479, 480.—*a*, Rio Negro Sarsaparilla; *b*, Honduras Sarsaparilla; transverse sections, enlarged.

The peculiar eccentric thickening of the sclerenchyma cells of the subcuticular portion and of the nucleus sheath affords additional means of identifying the different varieties of sarsaparilla by the aid of the microscope. (See Figs. 481–484.)

Constituents.—*Smilacin* (or *parillin*, or *salseparin*, or *parallinic acid*), which is an acrid neutral principle closely resembling *saponin.* Only one-fifth per cent. has been found in the drug. It crystallizes in white brilliant scales, is soluble in diluted alcohol and in boiling water, but insoluble in cold water or in absolute alcohol. Sarsaparilla also contains about two and one-half per cent. acrid resin, and traces of volatile oil.

The extractive matter of sarsaparilla is very dark colored and abundant. Its character is as yet little known. It has not been determined whether the medicinal properties of sarsaparilla are due to the *smilacin*,



FIGS. 481–484.—*a*, subcuticular cells of Vera Cruz Sarsaparilla; *b*, same of Honduras Sarsaparilla; *c*, nucleus sheath of Vera Cruz Sarsaparilla; *d*, same of Honduras Sarsaparilla; all magnified.

or to the resin, or to both. That saponin has powerful medicinal properties has been ascertained.

Medicinal Uses.—Sarsaparilla is one of the most popular of all remedies. As a "blood purifier" it is used in large quantities with and without the physician's advice, especially in *eruptive skin diseases*. It is an alterative and tonic.

Physicians prescribe it in *syphilis*, but nearly always in combination with more active remedies, such as potassium iodide, mercuric chloride, guaiac, etc. It is given in *secondary* and *tertiary syphilis*, and especially when the patient is in a broken-down condition. After a long-continued mercurial treatment sarsaparilla with potassium iodide is a valuable combination.

The fluid extract and the syrup are the most effective and convenient preparations.

Dose.—Powder, two to five grams (30 to 75 grains).

SARSAPARILLÆ DECOCTUM.

Decoction of Sarsaparilla.

From seventy-five grams (or about $2\frac{1}{2}$ avoirdupois ounces) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

A trifle stronger than the preparation of the British Pharmacopœia.

Dose.—Fifty to one hundred cubic centimeters (2 to 3 fluidounces).

SARSAPARILLÆ DECOCTUM COMPOSITUM.

Compound Decoction of Sarsaparilla.

Three hundred grams (10 ounces) cut and bruised sarsaparilla, sixty grams (2 ounces) rasped guaiacum wood, sixty grams sassafras, in No. 20 powder, sixty grams bruised glycyrrhiza, and thirty grams (1 ounce) cut

and bruised mezereum are required to make three thousand grams (about 100 ounces) of the decoction. The sarsaparilla and guaiacum wood are first boiled in three thousand cubic centimeters (6 pints) of water for half an hour ; then the other ingredients are added and macerated with the decoction for two hours, the vessel being well covered. Then the preparation is strained and enough water added through the strainer to make the finished product weigh three thousand grams (it will measure about 6 pints).

Dose.—Ninety to one hundred and fifty cubic centimeters (3 to 5 fluidounces) three times daily.

SARSAPARILLÆ DECOCTUM COMPOSITUM FORTIUS.

Stronger Zittmann's Decoction.

Macerate one hundred and twenty grams (4 ounces) finely cut sarsaparilla for twenty-four hours with nine liters (19 pints) water. Strain. Triturate together one gram (15 grains) red sulphide of mercury, in fine powder, five grams (77 grains) calomel, eight grams (124 grains) powdered alum, and eight grams powdered sugar ; tie the mixed powder into a folded piece of muslin, and suspend this in the infusion of sarsaparilla, previously put into an earthen vessel. Boil the liquid down to three liters (6⅓ pints). While yet hot add five grams (77 grains) bruised anise, five grams bruised fennel, fifteen grams (230 grains) cut glycyrrhiza, and thirty grams (1 ounce 25 grains) cut senna. When cold, strain without pressure, set the decoction aside to settle, and decant the clear.

SARSAPARILLÆ DECOCTUM COMPOSITUM MITIUS.

Weaker Zittmann's Decoction.

Mix the residue from the stronger Zittmann's decoction (in the quantity specified in the preceding formula) with sixty grams (2 ounces 50 grains) finely cut sarsaparilla. Boil with nine liters (19 pints) water until reduced to three liters (6⅓ pints). While still hot, add to it four grams (62 grains) each of bruised cardamom and cinnamon, and cut lemon-peel, and glycyrrhiza. When cold strain. Let stand to settle ; then decant the clear.

Both of the above decoctions are used in chronic syphilitic cachexia. On the first day of the cure the patient is given a cathartic of calomel and jalap, repeated at intervals of several days if necessary. On the morning of the second day the patient drinks one pint of warmed STRONGER decoction, while covered up in bed, so as to produce perspira-

tion. During the afternoon he drinks two pints *weaker* decoction, cold, and late in the evening one pint of cold *stronger* decoction. This plan is followed for six or eight days.

After an intermission of a week or two the treatment is repeated if necessary.

SARSAPARILLÆ EXTRACTUM.

EXTRACT OF SARSAPARILLA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brownish-black.

Dose.—0.50 to 2 grams (8 to 30 grains).

SARSAPARILLÆ EXTRACTUM COMPOSITUM FLUIDUM; U. S.

COMPOUND FLUID EXTRACT OF SARSAPARILLA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), first mix three hundred and seventy-five grams (14 ounces 100 grains, avoirdupois) sarsaparilla, sixty grams (2 ounces 50 grains, avoirdupois) glycyrrhiza (liquorice root), fifty grams (1 ounce 334 grains, avoirdupois) sassafras bark, and fifteen grams (230 grains) mezereum, all in No. 30 powder.

For the *first menstruum* use a mixture consisting of fifty grams (1 ounce 334 grains, avoirdupois) glycerin, one hundred and fifty grams ($6\frac{1}{4}$ fluidounces) alcohol, and three hundred grams (about 10 fluidounces) water.

Moisten the mixed powders with two hundred grams (about 7 ounces) of this mixture. Pack tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Percolate with the remainder of the *first menstruum*, and then with a *second menstruum* composed of alcohol and water in the proportion of one hundred grams ($3\frac{1}{3}$ fluidounces) alcohol to every two hundred grams ($6\frac{3}{4}$ fluidounces) of water.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of *first percolate*. Continue the percolation to exhaustion.

Evaporate the *second percolate* to soft extract, and then dissolve this in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

In this preparation the effects of sarsaparilla, mezereum, and sassafras,

all three of which drugs are generally considered to be "blood-purifiers," are combined, the liquorice root simply serving to improve the taste.

Useful in *scrofula, syphilis, chronic rheumatism, cutaneous diseases,* etc., either alone or in combination with more active remedies.

Dose.—Two to eight cubic centimeters ($\frac{1}{2}$ to 2 fluidrachms).

SARSAPARILLÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Sarsaparilla.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of one hundred and fifty grams (about $6\frac{1}{4}$ fluidounces) alcohol, three hundred grams (about 10 fluidounces) water, and fifty grams (about $1\frac{4}{5}$ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about $4\frac{1}{6}$ fluidounces) alcohol to every two hundred grams (about $6\frac{2}{3}$ fluidounces) of water.

Moisten the drug with two hundred grams (about 7 fluidounces) of the *first menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

SARSAPARILLÆ SYRUPUS COMPOSITUS; U. S.

Compound Syrup of Sarsaparilla.

Mix one hundred and fifty grams (5 ounces 127 grains) sarsaparilla, twenty grams (308 grains) guaiac wood, twelve grams (185 grains) pale rose, twelve grams glycyrrhiza, and twelve grams senna, all in No. 30 powder, and six grams (92 grains) sassafras, six grams anise, and six grams gaultheria, all in No. 20 powder. Moisten the mixture uniformly with three hundred cubic centimeters (10 fluidounces) diluted alcohol, and macerate for forty-eight hours; then pack it firmly in a cylindrical percolator, and percolate with diluted alcohol until six hundred grams (21 ounces 72 grains, or about 20 fluidounces) of percolate has been obtained. Evaporate the percolate on a water-bath until re-

duced to one-half its original weight ; then add one hundred cubic centimeters (3½ fluidounces) water, mix well, and afterward filter, adding enough water through the filter to make the total filtrate weigh four hundred grams (14 ounces 48 grains, or measure 13½ fluidounces). Then add six hundred grams (21 ounces 72 grains) sugar, dissolve this without the aid of heat, and strain.

This is a better preparation than that of 1870, in which the volatile oils were used instead of the sassafras, anise, and gaultheria. As the volatile oils were added simply to flavor the preparation, the drugs themselves being sufficient for that purpose without making the product unclear, the new formula is preferable. A still further improvement would be to dismiss from the preparation both the guaiac wood and the pale rose. The guaiac yields a portion of its resin to the diluted alcohol, but it is precipitated again on evaporating down the liquid and adding water, so that there is nothing in the product derived from the guaiac. As for the pale rose, it is an expensive and useless luxury.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Sassafras ; U. S.

Sassafras.

Sassafras Radicis Cortex.

Origin.—*Sassafras officinalis*, Nees (*Lauraceæ*).

Habitat.—North America.

Part used.—The inner bark of the root.

Description.—See the Pharmacopœia, page 289.

Constituents.—Volatile oil, about three per cent., traces of tannin, resin, etc.

Medicinal Uses.—Enjoys the general reputation of being a "blood-purifier," and is popularly employed for that purpose. It is an aromatic diaphoretic when large quantities of the hot infusion are imbibed. In some parts of the country the infusion is used as a "tea," and may even be found on the bill of fare in hotels, etc.

SASSAFRAS EXTRACTUM FLUIDUM.

Fluid Extract of Sassafras.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of

three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—Two to five cubic centimeters (30 to 75 minims).

SASSAFRAS INFUSUM.

INFUSION OF SASSAFRAS.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Ad libitum.

Sassafras Medulla; U. S.

SASSAFRAS PITH.

The pith of the branches of *Sassafras officinalis*, Nees.

Description.—See the Pharmacopœia, page 290.

Constituents.—Mucilage.

Used for preparing a mucilage which serves as a diluent or vehicle for other remedies.

SASSAFRAS MEDULLÆ MUCILAGO; U. S.

MUCILAGE OF SASSAFRAS PITH.

Sassafras mucilage is made by macerating two grams (31 grains) sassafras pith for three hours with one hundred cubic centimeters (3⅓ fluidounces) distilled water, without stirring, and then straining without pressure.

SASSAFRAS SYRUPUS COMPOSITUS.

JACKSON'S PECTORAL SYRUP.

Macerate five grams (77 grains) sassafras pith and fifty grams (1 ounce 334 grains) acacia with five hundred cubic centimeters (17 fluidounces) water for twelve hours, stirring it gently occasionally. Then add seven hundred and fifty grams (26 ounces 200 grains) sugar, and dissolve it without the aid of heat. Strain. In the syrup dissolve 0.60 gram (9¼ grains) hydrochlorate of morphine.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Sassafras Oleum; U. S.

OIL OF SASSAFRAS.

Sassafras Ætheroleum — Volatile Oil of Sassafras.

Description.—See the Pharmacopœia, page 243.

Used for flavoring, or as a carminative.

Dose.—Two to three drops.

SASSAFRAS SPIRITUS.

Spirit of Sassafras.

Mix thirty cubic centimeters (1 fluidounce) volatile oil of sassafras and two hundred and seventy cubic centimeters (9 fluidounces) alcohol.

Used for flavoring.

Scammonii Radix.

Scammony Root.

Origin.—*Convolvulus Scammonia*, Linné (*Convolvulaceæ*).

Habitat.—Western Asia.

Description.—Carrot-shaped, from 0.3 to 0.6 meter (1 to 2 feet) long, and five to twenty centimeters (2 to 4 inches) thick, usually broken into shorter pieces more or less twisted, yellowish-brown externally, wrinkled, hard, whitish within; bark thin and full of resinous spots. Odor slight; taste sweetish, afterward a little acrid.

Constituents.—*Scammonin.* (See Scammonium.)

Used for preparing scammony resin.

Scammonium; U. S.

Scammony.

Scammonium, G. and Sw.; *Scammonée*, F.; *Escamonea*, Sp.; *Virgin Scammony.*

Origin.—*Convolvulus Scammonia*, Linné (*Convolvulaceæ*).

Habitat.—Syria, Minor Asia, and around the Black Sea. Imported from Aleppo and Smyrna.

Description and Tests.—See the Pharmacopœia, page 290.

The drug is the dried resinous exudation from the root. As it contains always some gum, and forms an emulsion when triturated with water, it is also sometimes styled as a gum-resin.

Scammony is darker interiorly than externally. In thin splinters it is translucent.

The best grades are called *virgin scammony.* All scammony, however, is liable to great variation in quality.

The pharmacopœial tests are prescribed with a view to detect such gross adulterations as chalk, starch, resin, etc., as well as an undue proportion of accidental mechanical impurities.

Scammony is so frequently adulterated by those who collect it, that it ought never to be used, except for preparing the resin of scammony. Scammony containing less than twenty-five per cent. resin is not rare.

The commercial and medicinal value of the drug depends upon the proportion of resin it contains. To ascertain this, exhaust ten grams of the powdered scammony with a sufficient quantity of ether, until the ether ceases to extract anything further; then dry and weigh the residue, and deduct its weight from the ten grams used; the remainder represents the weight of the resin.

Constituents.—It contains from seventy-five to ninety-five per cent. resin, the remainder being gum, etc. The resin is *scammonin* (or jalapin, or para-rhodeoretin), identical with the resin found in male jalap (Ipomœa orizabensis), and is completely soluble in alcohol and ether.

Medicinal Properties and Uses.—It is hydragogue cathartic, more violent in its action than jalap.

Dose.—0.5 to 1.50 gram (8 to 20 grains), usually in pill form and combined with other medicines.

SCAMMONII RESINA; U. S.

RESIN OF SCAMMONY.

The pure scammony resin is extracted from the crude drug (scammony) by repeated digestions with boiling alcohol. The tinctures are mixed, the alcohol distilled off, and the remaining syrupy liquid precipitated with water, the precipitated resin being then washed and dried. See the Pharmacopœia, page 282.

It is a dull-greenish powder.

Dose.—0.2 to 0.5 gram (3 to 8 grains).

Scilla; U. S.

SQUILL.

Scillæ Bulbus; Scillæ Radix—Meerzwiebel, G.; *Squille, Scille*, F.; *Escila, Cebolla albarrana*, Sp.; *Sjölök*, Sw.

Origin.—*Urginea Scilla*, Steinheil (*Liliaceæ*).

Habitat.—The Mediterranean.

Part used.—The sliced and dried bulb.

Description.—See the Pharmacopœia, page 290. Readily absorbs moisture and becomes damp. Must, therefore, be kept in a dry place.

"White squill" is the best, and fetches a higher price than the "red squill."

Constituents.—*Scillipicrin, scillitoxin*, and *scillin*—all active principles.

Medicinal Uses.—Squill is an acrid diuretic in small doses; in larger doses purgative and emetic, almost narcotic. It is also used as an expectorant or stimulant blennorrhetic in *chronic bronchitis*, etc.

When given in small doses, squill first produces undoubtedly diuretic effects, which may be followed by the purgative action. It is often used in *dropsies* in combination with jalap, cream of tartar, and other remedies.

Its long-continued use disturbs digestion. Overdoses give rise to vomiting, diarrhœa, slow pulse, diminished secretion of urine, and bloody urine containing albumen.

Dose.—0.05 to 1 gram (1 to 15 grains) according to the effect it is desired to obtain.

SCILLÆ ACETUM; U. S.

Vinegar of Squill.

Moisten thirty grams (or 1 ounce) squill in No. 30 powder, with ninety cubic centimeters (3 fluidounces) diluted acetic acid, and allowed to macerate until it ceases to swell. It is then packed carefully (not too firmly) into a conical glass percolator, and percolated with diluted acetic acid until three hundred cubic centimeters (10 fluidounces) of percolate has been received.

This preparation is one-fifth weaker than that of the old pharmacopœia (1870), and the dose should, therefore, be twenty-five per cent. greater. It is, however, seldom if ever used, except for preparing the syrup of squill.

Dose.—0.65 to 2 cubic centimeters (10 to 30 minims).

SCILLÆ EXTRACTUM.

Extract of Squill.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brown.

Dose.—0.03 to 0.06 gram ($\frac{1}{2}$ to 1 grain). With due caution the dose may be increased to 0.1 to 2 grams ($1\frac{1}{2}$ to 3 grains).

SCILLÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Squill.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 20 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred grams (about $4\frac{1}{6}$ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and seventy-five cubic centimeters ($12\frac{1}{5}$ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.2 to 1 cubic centimeter (3 to 15 minims).

SCILLÆ OXYMEL.

Oxymel of Squill.

Mix equal volumes of vinegar of squill and clarified honey.

Should always be prepared extemporaneously.

Used in expectorant cough mixtures.

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

SCILLÆ SYRUPUS; U. S.

Syrup of Squill.

Heat four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) vinegar of squill to the boiling point in a glass flask, or in a porcelain evaporating dish. Filter while hot. Add enough water to restore the liquid lost by evaporation. Add six hundred grams (21 ounces 72 grains) sugar, and dissolve this by agitation. Strain.

Should be perfectly clear and of a very pale straw color.

Dose.—Two to four cubic centimeters (30 to 60 minims) for an adult as an expectorant. This is a full emetic dose for a child.

SCILLÆ SYRUPUS AROMATICUS.

Aromatic Syrup of Squill.

Triturate fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) fluid extract of ginger and thirty cubic centimeters (1 fluidounce) fluid extract of squill with sixty grams (2 ounces) precipitated phosphate of calcium. Add during continued stirring four hundred and fifty cubic centimeters ($15\frac{1}{4}$ fluidounces) peppermint water. Filter. In the filtrate dissolve by agitation and without heat seven hundred and fifty grams (26 ounces 200 grains) sugar. Strain.

The syrup of squill of the Swedish Pharmacopœia is the above syrup, with the addition of the soluble matter of about one ounce of hyssop added to each eighteen ounces by weight, or twenty-four ounces by measure. The fluid extract of hyssop may be used for this purpose.

Dose.—Two to four cubic centimeters (30 to 60 minims).

SCILLÆ SYRUPUS COMPOSITUS; U. S.

Compound Syrup of Squill.

Mix sixty grams (2 ounces 50 grains) squill and sixty grams of senega, both in No. 30 powder. Moisten with one hundred and sixty-five cubic centimeters (5½ fluidounces) diluted alcohol. Macerate one hour. Then pack it in a conical percolator and percolate with diluted alcohol until four hundred and eighty cubic centimeters (16¼ fluidounces) percolate has been received. Boil the percolate a few minutes; then evaporate by means of a water-bath to one hundred and eighty cubic centimeters (6 fluidounces). To this add seventy-five cubic centimeters (2½ fluidounces) boiling water. Triturate the mixture with five grams (77 grains) precipitated phosphate of calcium. Filter, and after the liquid has passed, add through the filter enough boiling water to make the whole filtrate weigh three hundred and seventy-five grams (13 ounces 100 grains, measuring about 360 cubic centimeters, or 12¼ fluidounces). In this dissolve six hundred grams (21 ounces 72 grains) sugar, by agitation, without the aid of heat. Strain.

Dissolve 1.50 gram (23 grains) tartrate of antimony and potassium in thirty cubic centimeters (1 fluidounce) boiling water; add this solution to the syrup and shake well.

The compound syrup of squill is commonly called *Coxe's hive syrup*. Originally it was made with honey instead of sugar, and was then much more liable to ferment than it is as now prepared.

Dose.—Two to four cubic centimeters (30 to 60 minims) for adults. Less for children.

SCILLÆ TINCTURA; U. S.

Tincture of Squill.

Moisten ninety grams (3 ounces 76 grains) squill in No. 30 powder with one hundred and twenty cubic centimeters (4 fluidounces) diluted alcohol. Macerate twenty-four hours. Pack it moderately in a conical percolator and percolate with diluted alcohol until six hundred cubic centimeters (20 fluidounces) tincture has been obtained.

It is amber-colored.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

SCILLÆ VINUM.

WINE OF SQUILL.

Mix thirty cubic centimeters (1 fluidounce) fluid extract of squill with two hundred and seventy cubic centimeters (9 fluidounces) sherry wine. Let stand a few hours. Then filter, if necessary.

Dose.—One to five cubic centimeters (15 to 75 minims).

Scoparius; U. S.

SCOPARIUS.

Scoparii Summitates—Broom Tops.

Origin.—*Sarothamnus Scoparius*, Koch (*Leguminosæ*).

Habitat.—Europe.

Part used.—The tops.

Description.—See the Pharmacopœia, page 290.

Constituents.—A stellately crystalline principle, called *scoparin*, soluble in alcohol and water; and a volatile liquid alkaloid called *sparteine*. The scoparin is supposed to be diuretic, and the sparteine narcotic.

Medicinal Uses.—This drug is a diuretic and hydragogue cathartic of undoubted value for the removal of *dropsical effusions*. Its use is indicated in *chronic dropsy* from any cause.

Dose.—Two to five grams (30 to 75 grains) in decoction or fluid extract.

SCOPARII DECOCTUM; B.

DECOCTION OF SCOPARIUS.

Make three hundred cubic centimeters (10 fluidounces) decoction from fifteen grams ($\frac{1}{2}$ ounce) of the drug.

Dose.—Sixty to one hundred and twenty cubic centimeters (2 to 4 fluidounces).

SCOPARII EXTRACTUM FLUIDUM.

FLUID EXTRACT OF SCOPARIUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 20 powder.

As a *first menstruum* use a mixture of one hundred grams (about 4$\frac{1}{6}$

fluidounces) alcohol, two hundred and fifty grams (about 8⅓ fluidounce water, and sixty grams (about 2 avoirdupois ounces) glycerin.

As a *second menstruum* use alcohol and water mixed in the propo tion of sixty grams (about 2½ fluidounces) alcohol to every two hu dred and forty grams (about 8 fluidounces) of water.

Moisten the drug with two hundred and fifty grams (about 10 flui ounces) of the *first menstruum*. Pack it tightly in a cylindrical percol tor. Saturate with menstruum. Macerate forty-eight hours. Th percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *fi percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and th dissolve it in the *first percolate*. Add enough of the *second menstru* to make the whole measure five hundred cubic centimeters (or 17 flui ounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Scutellaria; U. S.

SCUTELLARIA.

Scutellariæ Herba—Helmkraut, G.; *Scutellaire*, F.; *Skullcap, Hoodwo Madweed.*

Origin.—*Scutellaria lateriflora*, Linné (*Labiatæ*).

Habitat.—North America.

Part used.—The flowering plant.

Description.—A square-branched stem about fifty centimeters (2 inches) long, smooth ; opposite leaves, about five centimeters (2 inche long, oblong, pointed, with saw-toothed margin ; blue, lateral, axilla flowers, eight millimeters (⅓ inch) long, the upper lip being helme shaped, whence the name "skullcap." Odor slight ; taste bitter.

Other species of *Scutellaria* are sometimes collected and sold f skullcap, among which *Scutellaria versicolor*, Nuttall ; *Scutellaria c nescens*, Nuttall ; *Scutellaria pilosa*, Michaux ; and *Scutellaria integr folia*, Linné. They are all hairy or downy, and all of them have t flowers on the top only, whereas the *Scutellaria lateriflora* has t flower-stalks in pairs in the axils. *Scutellaria galericulata*, Linné, also gathered ; this is nearly smooth, and has axillary flowers, but i flowers are three times as large as those of *Scutellaria lateriflora*.

Constituents.—Some bitter principle. No analysis. *Scutellarin* an extract precipitated from a strong tincture by means of a solution

alum in water. It is a mixture of indefinite composition and probably devoid of medicinal properties.

Properties and Uses.—It is said to be tonic, nervine, antispasmodic, and to have proved useful in *chorea, convulsions, intermittent fever*, etc. It is employed as a tea in *restlessness, wakefulness*, and *nervous excitability.*

We are informed by a prominent dealer in domestic crude drugs that large quantities of scutellaria are consumed for the purpose of extracting its chlorophyll, which is used for coloring extracts and fluid extracts.

Dose.—Five to ten grams (1 to $2\frac{1}{2}$ drachms) in infusion or fluid extract.

SCUTELLARIÆ EXTRACTUM.

Extract of Scutellaria.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.05 to 0.3 gram (1 to 5 grains) three or four times a day.

SCUTELLARIÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Scutellaria.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—$17\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of one hundred grams (about $4\frac{1}{6}$ fluidounces) alcohol to every two hundred grams (about $6\frac{2}{3}$ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about $6\frac{1}{3}$ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to $2\frac{1}{2}$ fluidrachms).

Secalis Farina.

RYE FLOUR.

Origin.—*Secale cereale*, Linné (*Graminaceæ*).

Description.—The flour prepared from the seed. It is yellowish-white, with a tinge of grayish-brown, its appearance varying according to the mode of grinding and the fineness.

Constituents.—Contains about sixty per cent. starch, nine and one-half per cent. gluten, three and one-fourth per cent. vegetable albumen, eleven per cent. dextrin, and three and one-fourth per cent. sugar. Rye flour is, therefore, rather less nutritious than wheat, containing as it does a smaller proportion of nitrogenous substances.

Uses.—It is very wholesome on account of its being somewhat laxative, so that the eating of rye-bread tends to correct chronic constipation.

Rye flour is sometimes used externally, in the same manner as other grain flours, as a soothing application to irritated or tender surfaces.

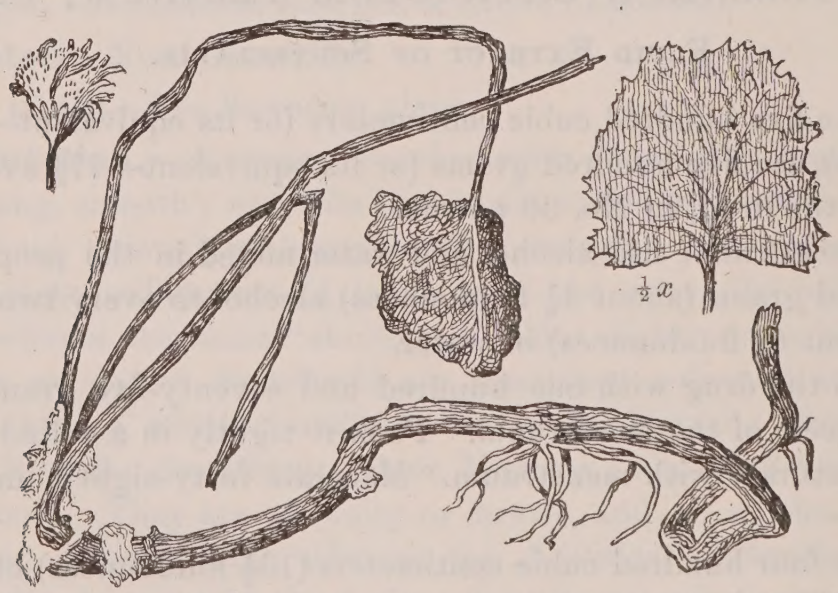
Senecio.

SENECIO.

Senecionis Herba—Life Root, Squaw Weed.

Origin.—*Senecio aureus*, Linné (*Compositæ*).

Habitat.—The United States.



FIGS. 485–487.—Senecio, with leaves attached as in crude drug, natural size; leaf, reduced; inflorescence, natural size.

Part used.—The whole plant.

Description.—See the figures. The ray-florets are yellow. The root has a bitter, somewhat acrid taste.

Constituents.—No analysis.

Medicinal Uses.—As the name "squaw-weed" implies, this plant was used by the Indians, and after them by the laity and physicians, as a remedy in female complaints, *amenorrhœa*, *dysmenorrhœa*, etc. It is diuretic.

Best given as FLUID EXTRACT, made with diluted alcohol as a menstruum.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

Senega; U. S.

SENEGA.

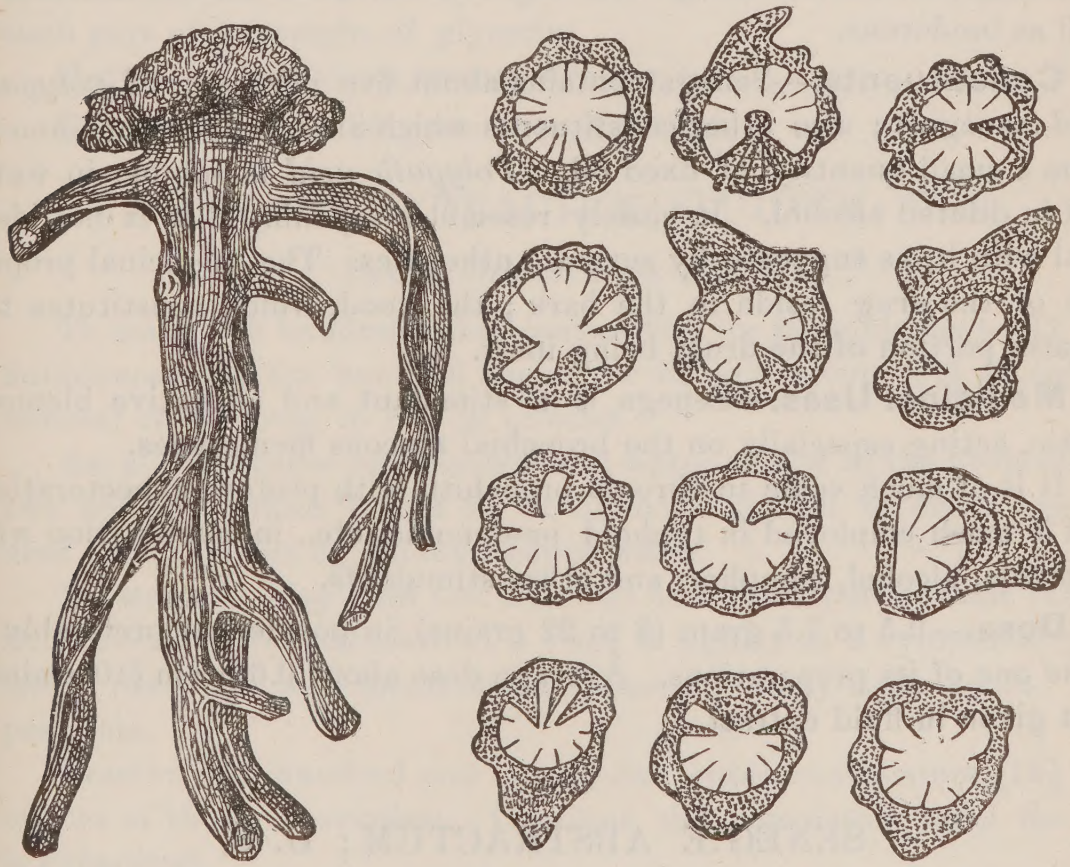
Senegæ Radix.

Origin.—*Polygala Senega*, Linné (*Polygalaceæ*).

Habitat.—The Southern States of the United States.

Part used.—The root.

Description.—See the Pharmacopœia, page 291. The figures rep-



FIGS. 488–500.—Senega, natural size and transverse sections, enlarged.

resent the upper portion of a pretty large specimen of *Southern Senega*, and of transverse sections of different specimens of this root.

A spindle-shaped, branched, somewhat tortuous root, with a thick, knotty crown. The crown is from four to six millimeters ($\frac{1}{6}$ to $\frac{1}{4}$ inch)

in diameter, and the root about ten centimeters (4 inches) long. In the drug the roots are pretty distinctly keeled, the keel running spirally from crown to apex. Externally wrinkled lengthwise, yellowish-brown or yellowish-gray; bark thick. Soaked in water the root becomes round and plump. Odor slight but disagreeable; taste at first insipid, sweetish, afterward acrid.

"Southern Senega" is the best.

Spurious senega is not infrequently met with. The roots of *Polygala Boykinii*, and other species of *polygala* resemble true senega. "Northern Senega," although perhaps collected from the same plant as the "Southern Senega," contains only three per cent. polygalic acid, while the Southern variety yields five per cent. Northern Senega is often destitute of the keel, has a regular cylindrical wood, a light yellowish color, and is thick and large.

We have met with other roots, probably of species of *polygala*, sold as senega, which were light yellowish, scarcely at all branched, abruptly tapering, without the keel, with very thin bark, and almost tasteless as well as inodorous.

Constituents.—Senega contains about five per cent. of *polygalic acid* (senegin); also other constituents which are unimportant—among them a small quantity of fixed oil. *Polygalic acid* is soluble in water and in diluted alcohol. It closely resembles saponin, if it is not identical with it, as supposed by several authorities. The medicinal properties of the drug reside in the bark; the wood, which constitutes the greater portion of the drug, being inert.

Medicinal Uses.—Senega is a stimulant and alterative blennorrhetic, acting especially on the bronchial mucous membranes.

It is of much value in chronic bronchitis with profuse expectoration, and is much employed in typhoid pneumonia, etc., in combination with ammonia, alcohol, camphor, and other stimulants.

Dose.—0.5 to 1.5 gram (8 to 22 grains), in powder, or preferably in some one of its preparations. Average dose about 0.6 gram (10 grains), best given in fluid extract.

SENEGÆ ABSTRACTUM; U. S.

Abstract of Senega.

Prepared in the same manner as other abstracts (see title Abstracta). The senega is exhausted by percolation with alcohol, and the fluid extract obtained is mixed with milk sugar, evaporated to dryness, powdered, and its quantity adjusted by the addition of powdered milk sugar,

so that each thirty grams (or 1 ounce) of the abstract represents sixty grams (or 2 ounces) of senega.

Dose.—0.2 to 0.75 gram (3 to 12 grains).

SENEGÆ DECOCTUM.

DECOCTION OF SENEGA.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Fifty to seventy-five cubic centimeters (12 to 18 fluidrachms) several times a day.

SENEGÆ EXTRACTUM.

EXTRACT OF SENEGA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown. Yield about twenty-five per cent.

Dose.—0.05 to 0.20 gram (1 to 3 grains).

SENEGÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF SENEGA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces, use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with two hundred and twenty-five grams (about 8 fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add first ten grams (154 grains) water of ammonia, and afterward enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.5 to 1.5 cubic centimeter (8 to 20 minims).

SENEGÆ INFUSUM.

INFUSION OF SENEGA.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of the British Pharmacopœia.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

SENEGÆ SYRUPUS; U. S.

SYRUP OF SENEGA.

Mix forty-five cubic centimeters (1½ fluidounce) fluid extract of senega with seventy-five cubic centimeters (2½ fluidounces) water; add 1.40 cubic centimeter (about 20 minims) water of ammonia, and shake well. Let the mixture stand a few hours; then filter through paper, adding enough water through the filter to make the whole filtrate measure one hundred and twenty cubic centimeters (4 fluidounces). To the filtrate add one hundred and eighty grams (6 ounces 150 grains) sugar, and dissolve it by agitation without the aid of heat. Strain.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

SENEGÆ SYRUPUS COMPOSITUS.

COMPOUND SYRUP OF SENEGA.

Jackson's Cough Syrup.

Mix two cubic centimeters (½ fluidrachm) each of fluid extract of rhubarb, fluid extract of ipecac, and fluid extract of senega with forty-five cubic centimeters (1½ fluidounce) simple syrup, and finally add forty-five cubic centimeters (1½ fluidounce) syrup of morphine, and shake the whole well together.

Senna; U. S.

SENNA.

Sennæ Folia—Sennesblätter, G.; *Feuilles de Séné, Séné*, F.; *Sen*, Sp.; *Senna*, Sw.

Origin.—*Cassia acutifolia*, Delile, yields ALEXANDRIA SENNA; *Cassia elongata*, Lémaire-Lisancourt, yields INDIA SENNA (*Leguminosæ*).

Habitat.—Africa. The India senna is cultivated in India.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 291.

Varieties.—The senna-yielding Cassias are herbaceous shrubs. Their leaves differ in form, size, color, and constituents.

ALEXANDRIA SENNA consists of thicker, paler, smaller leaflets than those composing India senna. They are grayish-green, smooth, have a characteristic nauseous odor and a bitterish taste, and are not as mucilaginous as the leaves of the other official variety.

It is usually considerably broken, and mixed with pods, coarse stems, and with more or less of the leaves of *Solenostemma Argel*, or "argel leaves," which are not present in any other variety of senna.

The argel leaves are thicker, have but one vein (the midrib), and a regularly shaped base.

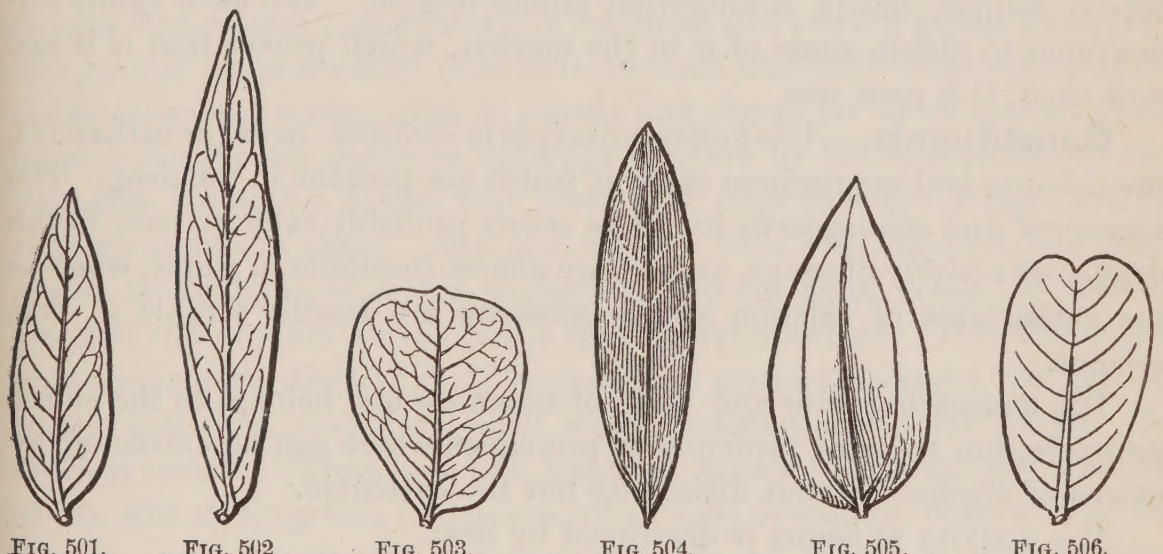


FIG. 501. FIG. 502. FIG. 503. FIG. 504. FIG. 505. FIG. 506.

FIG. 501.—Leaflet of Cassia Acutifolia.
FIG. 502.—Leaflet of Cassia Elongata.
FIG. 503.—Leaflet of Cassia Obovata.
FIG. 504.—Leaflet of Solenostemma Argel.
FIG. 505.—Leaflet of Coriaria.
FIG. 506.—Leaflet of Tephrosia.
All natural size.

INDIA SENNA consists of less thick but longer, larger, darker green, though dull, and very mucilaginous leaves, having a much less pronounced senna odor than that characteristic of the Alexandria senna. The India senna is much less broken than the Alexandria variety. The senna cultivated at Tinnevelly, in East India, is the best kind of India senna. It consists almost entirely of whole leaves of good, sound color, and is free from stems and other admixtures.

Alexandria senna leaves, entirely free from stems and other admixtures, are said to be about fifty per cent. more active than India senna. The Alexandria senna usually sold contains, however, one-half its weight or more of inert admixtures, whereas the Tinnevelly (India) senna is clean.

Besides the Alexandria and the India sennas, which are the only official kinds, there are two other varieties of senna in this market, viz.:

Tripoli Senna (from *Cassia æthiopica*) resembles Alexandria senna, but is even more broken up, and the fragments are thinner than the leaves of Alexandria senna.

Mecca Senna resembles the India senna, but is broken, discolored, brownish-yellow.

The forms and sizes of different varieties of senna leaves, the leaves of *Solenostemma Argel*, and also the leaves of *Coriaria myrtifolia*, Linné, and *Tephrosia appolinea*, De Candolle, which have been found among senna, are here figured.

Maryland Senna (from *Cassia marylandica*, Nectoux) was official in the old Pharmacopœia (1870). It possesses the same properties as the official sennas, but in a somewhat milder degree. We have vainly endeavored to obtain some of it in the market, which proves that it is not now used, if it ever was.

Constituents.—The active principle is *cathartic acid* (or cathartin), the calcium and magnesium salts of which are present in the drug. The *sennacrol* and *sennapicrin* found in senna probably take no part in the medicinal activity of senna, as they are almost insoluble in water, whereas the cathartates of calcium and magnesium are readily soluble in that solvent.

The nauseating odor and taste of senna do not belong to the active principle, but to some principle or principles which can be extracted by means of alcohol without dissolving out the cathartin.

The activity of senna is destroyed by heat.

Medicinal Uses.—Senna is an active, but not acrid cathartic, certain and efficient in its action, producing copious stools in about four hours. Its use is not apt to be followed by subsequent constipation.

The tendency of this remedy to produce griping may be obviated by combining with carminatives or aromatics.

Senna is useful in *chronic constipation*, *constipation in pregnancy*, *hemorrhoids*, etc. If taken by a nursing woman, her milk acquires purgative properties.

Dose.—Two to ten grams (30 to 150 grains) in powder, but preferably in the form of infusion or fluid extract.

SENNÆ FOLIA SPIRITU EXTRACTA.

Alcohol-Washed Senna.

Senna-leaves are macerated with four times their weight of alcohol for two days. The alcohol is then poured off and the senna allowed to dry.

The object of this process is to remove from the drug those substances which possess its characteristic nauseous odor and taste. These substances are extracted by the alcohol, which does not take up any of the active principle of the drug (cathartic acid).

Alcohol-washed senna is a pleasant and certain laxative.

Dose.—Same as of plain senna.

SENNÆ CONFECTIO; U. S.

Confection of Senna.

The preparation is the same in the new Pharmacopœia as in the old.

Put one hundred and sixty grams (5 ounces 280 grains) cassia fistula, one hundred grams (3 ounces 230 grains) tamarind, seventy grams (2 ounces 200 grains) prune, and one hundred and twenty grams (4 ounces 100 grains) fig in a vessel with four hundred and fifty cubic centimeters (15 fluidounces) water, cover it closely and digest for three hours. Then remove the coarser particles from the mixture by the hand, and rub the pulp first through a coarse hair sieve and then through a fine one, or through a muslin cloth. Mix the residue with one hundred and fifty grams (5 fluidounces) water, digest for half an hour, strain as before, and add the product to the pulpy liquid first obtained. Put the whole on a water-bath, dissolve in it five hundred grams (15 ounces 280 grains) sugar, and then evaporate until eight hundred and forty grams (28 ounces) remain. Then add one hundred grams (3 ounces 230 grains) senna and sixty grams (2 ounces 50 grains) coriander, both in No. 60 powder, and incorporate thoroughly so as to obtain a uniform confection.

This preparation may be given alone or it may be used as the vehicle for other more active purgatives.

Dose.—Five to ten grams (75 to 150 grains).

SENNÆ EXTRACTUM.

Extract of Senna.

May be prepared by evaporating the fluid extract until an extract of soft pilular consistence remains. Owing to the fact that the active principle of senna is destroyed by heat, the solid extract of this drug is nearly inert.

It is given in the same doses, or even in larger doses, than powdered senna.

SENNÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Senna.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every four hundred grams (about 13½ fluidounces) of water.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the *menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

This fluid extract cannot be made satisfactorily except by repercolation, as all heat must be avoided. When prepared by repercolation it is the most active preparation of senna that the physician can prescribe.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

SENNÆ EXTRACTUM FLUIDUM AQUOSUM.

Aqueous Fluid Extract of Senna is in great demand. It is obvious enough that what is aimed at is a fluid extract of senna free from the griping and nauseous principles extracted by an alcoholic menstruum. We have seen many specimens of so-called "aqueous fluid extract of senna." All of them possessed more or less of the active properties of the senna; some were far from being free from the objectionable properties which distinguish an alcoholic preparation of this drug; and all appeared to be unlike each other. In short, there seems to be no uniform method of preparing it.

It may be set down as a fact that a fluid extract of senna made with water alone is an impossibility. The large quantity of mucilage in the drug renders its complete exhaustion by any form of percolation with water quite impossible. As for the extraction of the virtues of the senna by simple maceration and expression, it cannot be effected without obtaining a volume of liquid far in excess of the prescribed standard strength of a proper fluid extract.

It is, of course, necessary to completely exhaust the drug, because otherwise we cannot know the strength of the resulting preparation.

If it be admitted that a partial exhaustion is sufficient, then the extract does not represent the whole of the drug used, nor is it practicable to make out even approximately what it does represent, for it does not even represent any portion of the drug, strictly speaking. It simply would represent uncertain proportions of portions of the soluble constituents of the drug treated.

We are informed that several pharmacists prepare an "aqueous fluid extract of senna" by macerating cut senna in water, pouring off the strong infusion, and then macerating the residue with a second portion of water, after which the liquids are mixed and enough alcohol added to precipitate the gum and also to preserve the preparation. This method undoubtedly gives a strong infusion of senna, possessing the medicinal properties of the drug without the griping and nauseating effects; but its strength is very far from that of a fluid extract, and extremely uncertain and variable. Should the quantity of liquid obtained exceed the volume of the fluid extract to be made, the excess cannot be gotten rid of by evaporation without seriously impairing, if not destroying, the medicinal properties, which (in senna) will not bear heat at all.

A true fluid extract of senna, of uniform and reliable strength, and free from the nauseating odor and taste, and the griping properties of the drug, can be correctly prepared only by carefully removing the principles to which these objectionable properties are due, and then preparing the fluid extract from the deodorized and purified drug. The resulting preparation, however, could not properly be called an aqueous fluid extract of senna, but should be named

SENNÆ EXTRACTUM FLUIDUM DEPURATUM.

Purified Fluid Extract of Senna.

This, as seen from the observations in the preceding paragraph, is proposed as a rational substitute for the so-called "aqueous fluid extracts of senna," which are notoriously variable in character and strength.

It is prepared simply by using alcohol-washed senna (see Sennæ Folia Spiritu Extracta) instead of the ordinary senna, otherwise proceeding precisely as in preparing the official fluid extract of senna, using, however, repercolation instead of the pharmacopœial method, in order to avoid the ruinous effects of heat upon the active properties of senna.

This preparation, when well made, is a pure, deodorized, liquid senna of definite strength, and pleasant as well as certain in its effects.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

SENNÆ INFUSUM.

Infusion of Senna.

From thirty-five grams (about 1¼ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—About fifty to one hundred and fifty cubic centimeters (1½ to 5 fluidounces).

SENNÆ INFUSUM COMPOSITUM; U. S.

Compound Infusion of Senna.

Black Draught.

Put into a jar thirty grams (1 ounce) senna, sixty grams (2 ounces) manna, sixty grams (2 ounces) sulphate of magnesium (Epsom salt), and ten grams (150 grains) fennel, bruised. Pour five hundred grams (17 fluidounces) of boiling water upon the ingredients, cover the jar, and macerate until cool. Then strain, and add enough water through the strainer to make the finished infusion weigh five hundred grams (or measure 16 fluidounces).

This preparation possesses the laxative properties of senna, manna, and Epsom salt; but by combining these remedies with each other and with the carminative, the tendency to gripe is almost entirely overcome, and the action is, therefore, more pleasant than the action of any of the active remedies when taken alone.

Dose.—Fifty to seventy-five cubic centimeters (1½ to 2½ fluidounces) every four hours until it operates.

SENNÆ INFUSUM COMPOSITUM SUECICUM.

Swedish Compound Infusion of Senna.

Macerate fifteen grams (½ ounce) bruised coriander, thirty-five grams (1⅙ ounce) bruised raisins, and seventy-five grams (2½ ounces) cut senna with six hundred cubic centimeters (20 fluidounces) boiling water for an hour. Strain. Dissolve thirty-five grams (1¼ ounce) Rochelle salt, and one hundred and fifty grams (5 ounces) manna in the hot infusion. Strain again, and add enough water through the strainer to make the final product measure seven hundred and twenty cubic centimeters (24 fluidounces).

A similar infusion is used in Germany under the name of "Wiener Tränkchen."

Dose.—Thirty to ninety cubic centimeters (1 to 3 fluidounces), repeated if necessary.

SENNÆ SPECIES LAXANTES ST. GERMAIN.

St. Germain Tea.

Mix forty-five grams (1½ ounce) senna, thirty grams (1 ounce) elder-flowers, fifteen grams (½ ounce) fennel, fifteen grams (½ ounce) anise, and fifteen grams (½ ounce) bitartrate of potassium.

Dose.—About one-fourth of the above in infusion.

SENNÆ SYRUPUS; U. S.

Syrup of Senna.

Digest one hundred grams (3 ounces 230 grains) bruised senna in four hundred and eighty cubic centimeters (16 fluidounces) water at 50° C. (122° F.) for twenty-four hours. Express, and strain the infusion. Digest the residue once more with water of the same temperature as before, but using this time only two hundred and ten cubic centimeters (7 fluidounces). Again express and strain. Mix the colatures and evaporate the whole to ninety cubic centimeters (3 fluidounces). Let the liquid cool. Mix fifteen cubic centimeters (½ fluidounce) alcohol with about two drops oil of coriander, and add this mixture to the concentrated infusion of senna. Filter, and add enough water through the filter to make the whole filtrate weigh one hundred and twenty grams (or measure about 4 fluidounces). Then add one hundred and eighty grams (6 ounces 150 grains) sugar, dissolve without heat, and strain.

Practically the same preparation is more conveniently obtained by mixing thirty cubic centimeters (1 fluidounce) fluid extract of senna, one cubic centimeter (16 minims) spirit of coriander, and sixty cubic centimeters (2 fluidounces) simple syrup.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

SENNÆ SYRUPUS MANNATUS.

Syrup of Senna and Manna.

Infuse thirty grams (1 ounce) senna, three grams (46 grains) fennel, three grams coriander, and forty-five grams (1½ ounce) manna with one hundred and fifty cubic centimeters (5 fluidounces) hot water for two hours. Strain and add enough hot water through the strainer to make the total colature measure one hundred and fifty cubic centimeters (5 fluidounces). Set this aside to settle, and then decant the clear liquid and filter the remainder, adding enough water through the filter to obtain one hundred and fifty cubic centimeters (5 fluidounces) filtrate. Dissolve one hundred and eighty grams (6 ounces 150 grains)

sugar in the filtrate, without the aid of heat. Strain. Add enough simple syrup to make the final product measure three hundred cubic centimeters (10 fluidounces).

Dose.—Five to thirty cubic centimeters (1 to 8 fluidrachms).

Serica.

TISSUES.

Silk, or paper, or some other thin material saturated with some medicament for external application is called *sericum.*

Serpentaria; U. S.

SERPENTARIA.

Serpentariæ Radix—Snake Root, Virginia Snake Root.

Origin.—*Aristolochia Serpentaria,* Linné, and *Aristolochia reticulata,* Nuttall (*Aristolochiaceæ*).

Part used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 292. Should be clean

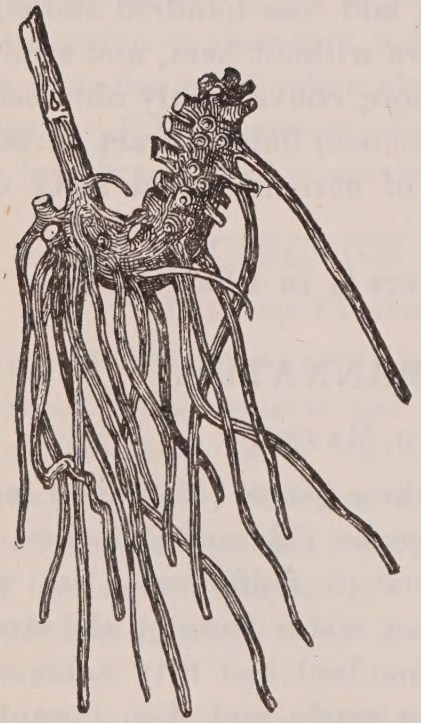
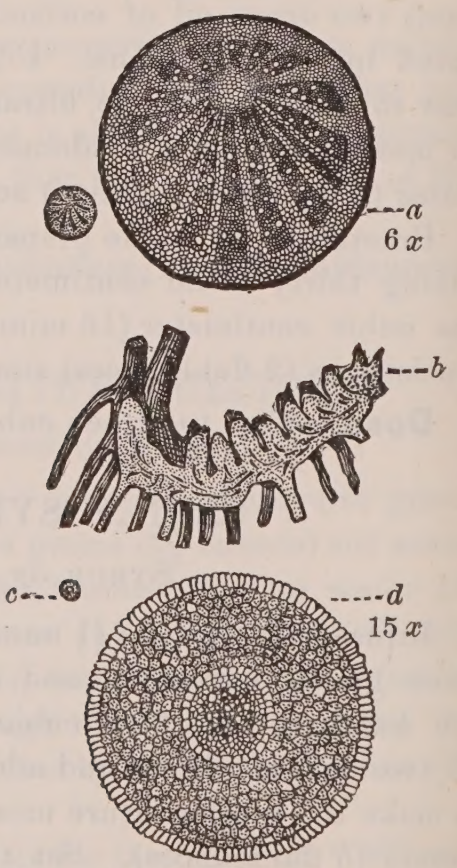


FIG. 507.—Serpentaria, whole, after being soaked in water.



FIGS. 508–512.—Serpentaria. *a,* transverse sections of rhizome, natural size and enlarged; *b,* longitudinal section of soaked rhizome, natural size; *c,* transverse sections of rootlet, natural size and enlarged.

and have a good serpentaria odor and taste, which remind of camphor and turpentine.

Serpentaria resembles spigelia somewhat in general appearance. Serpentaria is, however, brown, while spigelia is nearly black externally.

Constituents.—Volatile oil and resin; also a bitter substance (*aristolochin*), soluble in water and in alcohol.

Medicinal Uses.—Serpentaria is a stimulant remedy often employed in *typhus* and *typhoid fevers*, and in *typhoid conditions* generally.

It is much used in *typhoid pneumonia*, in low forms of *diphtheria*, *eruptive fevers*, etc., and may advantageously be combined with other stimulants, as carbonate of ammonia, camphor, ether, alcohol, or cinchona.

Dose.—Two to four grams (30 to 60 grains); best given in fluid extract.

SERPENTARIÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Serpentaria.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to four cubic centimeters (30 to 60 minims).

SERPENTARIÆ INFUSUM.

Infusion of Serpentaria.

From twenty grams (about ⅔ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms) every two or three hours.

SERPENTARIÆ TINCTURA; U. S.

TINCTURE OF SERPENTARIA.

Percolate thirty grams (1 ounce) serpentaria, in No. 40 powder, with diluted alcohol, after twenty-four hours' maceration with that menstruum, until three hundred cubic centimeters (10 fluidounces) tincture has been obtained.

The pharmacopœial menstruum is too weak; it should be alcohol instead of diluted alcohol.

This preparation is reduced in strength so as to be one-third weaker than the preparation of the old pharmacopœia.

Dose.—Two to ten cubic centimeters ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms) repeated as required.

Sesami Oleum; U. S.

OIL OF SESAMUM.

Sesamöl, G.; *Huile de Sésame*, F.; *Sesamolja*, Sw.; *Oil of Benné.*

Origin.—*Sesamum indicum*, Linné (*Pedaliaceæ*).

Part used.—The fixed oil expressed from the seeds.

Description.—See the Pharmacopœia, page 243.

Sesamum oil is quite bland, very nearly odorless, and rich in olein. It keeps better than olive oil. It is said to possess emmenagogue properties, but it is rarely used internally. Its chief use is as a hair oil.

Sevum; U. S.

SUET.

Sebum Ovillum—Talg, Hammeltalg, G.; *Suif*, F.; *Sebo*, Sp.; *Fårtalg*, Sw.; *Mutton-Suet.*

Origin.—*Ovis Aries*, Linné (*Mammalia*).

Part used.—The internal abdominal fat, purified by melting and straining ("rendering").

Description.—See the Pharmacopœia, page 292.

Must be clean, white, fresh, and well rendered. Rancid suet is expressly prohibited for pharmacopœial uses, because it is irritating. Mutton-suet, the only kind to be used in pharmacy, is more firm (containing less olein) than beef-suet, and is also whiter. It rapidly turns rancid, especially if any water was allowed to remain with it when rendered. All membranes, blood, etc., must be entirely absent in good suet. Winter suet is best.

Used in ointments and cerates.

Simaruba.

SIMARUBA.

Simarubæ Radicis Cortex—Ruhrrinde, G.; *Simaruba Bark.*

Origin.—*Simaruba officinalis*, De Candolle, and *Simaruba medicinalis*, Endlicher (*Simarubaceæ*).

Habitat.—South America and the West Indies.

Part used.—The bark of the root.

Description.—Troughs, or rarely quills, several feet long, three to ten centimeters (1 to 4 inches) wide, and three to six millimeters ($\frac{1}{8}$ to $\frac{1}{4}$ inch) thick; externally rough with a yellowish-brown suber; inner surface lighter; tough; odorless; intensely and persistently bitter.

Constituents.—Volatile oil and resin in very small quantities; a bitter substance said to be identical with the *quassin* in quassia.

Medicinal Uses.—Bitter tonic. Often used in *diarrhœas* and *dysenteries*, in which diseases it is often of marked value, especially when they are due to an atonic condition of the intestines.

In large doses its action resembles that of ipecac, causing vomiting and purging, and it is not unlikely that its beneficial action in *dysentery* is similar to that of ipecac in the same affection.

Dose.—Two to five grams (30 to 75 grains); best given as FLUID EXTRACT made with diluted alcohol as a menstruum.

Sinapis Alba; U. S.

WHITE MUSTARD.

Sinapis Albæ Semina — Weisser Senf, G.; *Moutarde blanche*, F.; *Mostaza blanca*, Sp.; *Hvit Senap, Gul Senap*, Sw.; *White Mustard Seed, Yellow Mustard Seed.*

Origin.—*Sinapis alba*, Linné (*Cruciferæ*).

Habitat.—Cultivated. Very handsome white mustard is grown in California.

Part used.—The seeds.

Description.—See the Pharmacopœia, page 292.

Constituents.—About twenty to twenty-five per cent. yellowish, bland, fixed oil, a proteid called *myrosin*, and *sinalbin*. Mustard contains no starch. No *volatile oil* exists in the seeds; but when the ground mustard is mixed with water the *sinalbin* is broken up (through the action of the *myrosin*) and the so-called volatile oil of mustard is then formed.

As heat and alcohol coagulate the myrosin, mustard should not be mixed with hot water, nor with spirit.

White mustard is inodorous, even when powdered and mixed with water ; but it has a sharp, acrid taste.

Used mainly as a condiment.

Sinapis Nigra ; U. S.

BLACK MUSTARD.

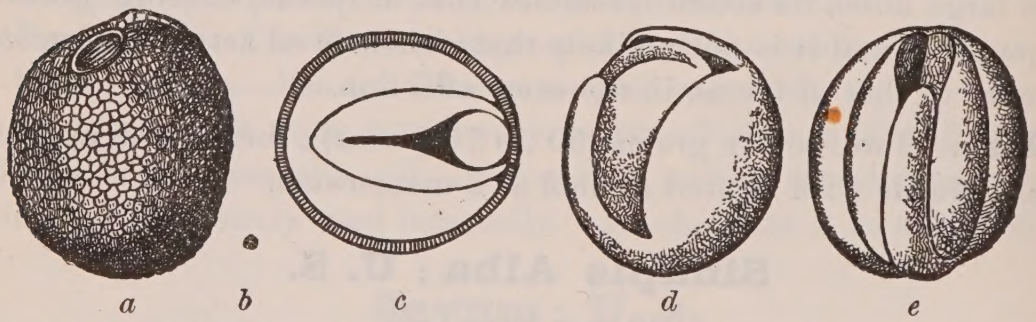
Sinapis Nigræ Semina—Schwarzer Senf, G.; *Moutarde noire*, F.; *Mostaza negra*, Sp.; *Svart Senap*, Sw.; *Black Mustard Seed.*

Origin.—*Sinapis nigra*, Linné (*Cruciferæ*).

Habitat.—Cultivated. Trieste black mustard is usually very handsome.

Part used.—The seeds.

Description.—See the Pharmacopœia, page 292. Only half as



FIGS. 513-516.—Black Mustard Seed. *a*, enlarged ; *b*, natural size ; *c*, transverse section, enlarged ; *d* and *e*, embryo, enlarged, shown from different sides.

large as the white mustard seeds. When ground and moist the black mustard emits an extremely irritating and offensive odor.

The most pungent and acrid mustard plaster is made from black mustard ; but the best table mustard is obtained from white mustard and black mustard mixed.

Constituents.—Fixed oil, about twenty-five per cent.; *sinigrin ;* and *myrosin.* No starch and no volatile oil. When moistened, the black mustard at once emits a strong irritant odor, from volatile oil of mustard formed from the sinigrin through the influence of the myrosin in the presence of the water.

Medicinal Uses.—Aromatic stimulant when given internally. In large doses, emetic. Rubefacient externally.

Dose.—As an emetic, eight to fifteen grams ($\frac{1}{4}$ to $\frac{1}{2}$ ounce).

SINAPIS BALNEUM.

Mustard Bath.

This is made by filling a tub with warm (not hot) water to the desired depth, and, having tied a few ounces of powdered black mustard in a small bag of muslin or a handkerchief, alternately soaking and expressing the mustard in the water until the latter is well charged with its pungency. The patient is then placed in the bath and the skin is briskly rubbed with the bag of mustard, which is used like a sponge. When the skin is well reddened the patient is taken from the bath, rapidly dried, and laid in bed out of the way of any draught of air. The above method of using the mustard bath is much to be preferred to throwing the loose mustard in the water, as in the latter case it is very difficult to clean the skin of the patient, and each particle adhering to the skin keeps up a smarting like the pricking of a needle, thus preventing the patient from finding rest and sleep.

While cold water would better develop the rubefacient qualities of mustard, yet the cold bath is usually not well borne when the mustard bath is indicated.

The mustard bath is a remedy of great value in many of the diseases of childhood, especially if there is *cerebral irritation* and *convulsions* threaten or actually occur. It is soothing, quieting, and very useful in *high fevers*, *convulsions*, and *restlessness* or *sleeplessness* from any cause. It is often preferable to the internal administration of anodynes or soporifics, as it has no evil after-effects. Of course other treatment may have to accompany its use, except, perhaps, when it is used as a cure for sleeplessness.

SINAPIS CATAPLASMA.

Mustard Poultice.

Mustard Plaster.

Mix ground black mustard with enough cold water to give the mixture the proper consistence.

A milder mustard poultice may be made by mixing sixty grams (2 ounces) ground flaxseed with two hundred and forty cubic centimeters (8 fluidounces) boiling water, allowing this poultice to become almost cold, and then incorporating sixty grams (2 ounces) ground black mustard.

Vinegar should not be used in making mustard plasters, nor should hot water be employed, as both prevent the formation of the volatile oil, which is the essential constituent of the plaster or poultice.

The poultice should be spread between two thicknesses of thin muslin, to facilitate its removal after its effects have been produced.

SINAPIS CHARTA; U. S.

MUSTARD PAPER.

Pack a convenient quantity of black mustard (No. 60 powder) into a percolator and exhaust it by percolation with benzin until the liquid passing through ceases to make permanent grease spots on blotting-paper. Then take the mustard out of the percolator and dry it. When dry mix it with a sufficient quantity of solution of gutta-percha to form a semi-liquid mixture. Paint this on suitable pieces of stiff, well-sized paper, on one side only, with a brush, so as to cover the surface well. Then let it dry. The mustard mixture or varnish should be used so that each 6.5 square centimeters (or 1 square inch) of the finished mustard paper contains about forty centigrams (6 grains) of the black mustard. A piece 10 by 12.50 centimeters (4 by 5 inches) would thus require eight grams (120 grains) of mustard, and to make ten such pieces would require about ninety grams (or 3 ounces) powdered black mustard, allowing for waste.

The object of the exhaustion of the mustard with benzin is to remove the fixed oil.

This preparation is an improvement on that of the pharmacopœia of 1870.

It is **used** as a counter-irritant and is a cleanly substitute for the mustard poultice. When it is to be used it must be dipped into cold or moderately warm water.

Sinapis Oleum.

OIL OF MUSTARD SEED.

Sinapis Oleum Expressum.

A pale yellow, bland, fixed oil, expressed from white mustard seed; odorless; tasteless. Keeps well, being less liable to become rancid than many other fixed oils.

It is **used** in large quantities both alone and as an adulterant of olive oil.

Sinapis Oleum Volatile; U. S.

VOLATILE OIL OF MUSTARD.

Sinapis Ætheroleum—Aetherisches Senföl, G.; *Essence de moutarde*, F.; *Flyktig Senapsolja, Allyl-sulphocyanide, Rhodan-allyl.*

Description.—See the Pharmacopœia, page 243.

Must be handled carefully as it is extremely acrid.

SINAPIS LINIMENTUM COMPOSITUM; U. S.

COMPOUND MUSTARD LINIMENT.

Dissolve six grams (92 grains) extract of mezereum and eighteen grams (278 grains) camphor in two hundred and forty cubic centimeters (8 fluidounces) alcohol. Then add nine grams (140 grains) volatile oil of mustard, and forty-five grams (1½ ounce) castor oil, and finally enough alcohol to make the whole weigh three hundred grams (10 ounces 255 grains, measuring about 12 fluidounces).

New to the U. S. Pharmacopœia. It has long been official in the British Pharmacopœia.

Rubefacient, counter-irritant, stimulant; used in *chronic rheumatism*, etc.

SINAPIS SPIRITUS.

SPIRIT OF MUSTARD.

Mix five grams (77 grains) volatile oil of mustard and two hundred and fifty grams (8 ounces 358 grains, or about 10½ fluidounces) alcohol.

Bibulous paper saturated with this spirit is sometimes used externally instead of a mustard poultice.

Sodium.

SODIUM.

Natrium.

Occurs in large quantities in combination with chlorine as common salt—sodium chloride.

The metal is obtained in the same manner as potassium—by distilling a mixture of the carbonate with carbon.

Sodium resembles potassium very much; but does not oxidize so readily. Its affinity for oxygen is, however, sufficiently great to necessitate its being kept in petroleum. (See Potassium.)

The salts of sodium are generally colorless or white, and, with very few exceptions, readily soluble in water. They frequently contain water of crystallization, and many of them effloresce when exposed to the air.

Soda; U. S.

SODA.

Sodicus Hydras—Sodium Hydrate; Natricus Hydras, Natrum Causticum, Natron—Aetznatron, G.; *Soude caustique*, F.; *Sosa caustica*, Sp.; *Kaustikt Natron*, Sw.; *Caustic Soda.*

Description and Tests.—See the Pharmacopœia, page 293.

Medicinal Uses.—Similar to those of potassa.

SODÆ LIQUOR; U. S.

SOLUTION OF SODA.

Solutio Sodici Hydratis—Solution of Sodic Hydrate; Liquor Natri Caustici, Solutio Hydratis Natrici—Aetznatronlauge, G.; *Soude caustique liquide*, F.; *Solucion de sosa Caustica, Lejia del Jabonero*, Sp.; *Natronlut*, Sw.

Dissolve one hundred and eighty grams (6 ounces 150 grains) sodium carbonate in four hundred cubic centimeters (13½ fluidounces) of boiling distilled water. Slake sixty grams (2 ounces) lime with four hundred cubic centimeters distilled water, and heat to boiling. Then add the solution of sodium carbonate to the milk of lime, and continue boiling ten minutes. Then take the vessel from the source of heat, cover it, and when the liquid is cool add enough distilled water to make the whole weigh one thousand grams (35 ounces 120 grains). Strain, or after settling draw off the clear solution with a siphon.

Solution of soda can also be made by dissolving fifty-six grams (1 ounce 427 grains) caustic soda in nine hundred and forty-four grams (32 fluidounces) distilled water, and filtering the solution through white filtering-paper.

Must be kept in well-closed bottles, the corks being dipped in melted paraffin, or in glass-stoppered bottles, the stoppers of which have been rubbed over with petrolatum to keep them from sticking fast.

Description.—Clear, colorless, inodorous, acrid, caustic, strongly alkaline. Specific gravity 1.059, corresponding to rather more than 8° Baumé. It contains five per cent. of sodium hydrate.

Medicinal Uses.—Very rarely employed internally. Sometimes given in the "alkaline treatment" of rheumatism.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims), largely diluted with flavored water.

Sodii Acetas; U. S.

ACETATE OF SODIUM.

Sodicus Acetas—Sodium Acetate; Essigsaures Natron, G.; *Acétate de soude*, F.; *Acetato de sosa*, Sp.; *Ättiksyradt Natron*, Sw.

Description and Tests.—See the Pharmacopœia, page 293.

Must be kept in well-corked bottles to prevent loss of acetic acid. Ought also to be put in a cool place.

Medicinal Uses.—Diuretic and antacid. Seldom employed.

Dose.—Two to eight grams (30 to 120 grains) in solution.

Sodii Arsenias; U. S.

ARSENIATE OF SODIUM.

See "Arsenias Sodii," page 185.

SODII ARSENIATIS LIQUOR; U. S.

SOLUTION OF ARSENIATE OF SODIUM.

See "Arseniatis Sodii Liquor," page 185.

Sodii Benzoas; U. S.

BENZOATE OF SODIUM.

Sodicus Benzoas—Sodium Benzoate.

Description and Tests.—See the Pharmacopœia, page 294.

Only sodium benzoate prepared with true (natural) benzoic acid from benzoin is to be used. That made from artificial (so-called "German") benzoic acid is not officially recognized as fit for medicinal use.

Not in the old Pharmacopœia (1870).

The lithium benzoate is more effective; but also more expensive.

Medicinal Uses.—Those of benzoic acid.

Dose.—One to eight grams (15 to 120 grains) during the day.

Sodii Bicarbonas; U. S.

BICARBONATE OF SODIUM.

Sodicus Bicarbonas—Sodium Bicarbonate; Natrum Bicarbonicum, Natrum Carbonicum Acidulum—Doppelkohlensaures Natron, G.; *Bicarbonate de Soude, Sel de Vichy*, F.; *Bicarbonato de Sosa*, Sp.; *Surt Kolsyradt Natron, Tvåfaldt Kolsyradt Natron*, Sw.

Description and Tests.—See the Pharmacopœia, page 295.

Must be perfectly white and give a clear solution with distilled water.

Medicinal Uses.—Antacid. Often given in *heartburn* to neutralize the excess of acid in the stomach. Its action in such cases is merely palliative, as it does not reduce the secretion of gastric juice.

Given before meals it aids digestion by stimulating the secretion of gastric juice.

It may be given to render the urine alkaline, and whenever the use of an antacid is indicated.

Dose.—One to two grams (15 to 30 grains).

SAL VICHY EFFERVESCENS.

EFFERVESCENT VICHY SALT.

Mix thoroughly eighty grams (2 ounces 360 grains) sugar, one hundred grams (3 ounces 230 grains) citric acid, one hundred and forty grams (4 ounces 410 grains) bicarbonate of sodium, fifteen grams (230 grains) carbonate of magnesium, nineteen grams (300 grains) carbonate of calcium, thirty grams (1 ounce) chloride of sodium, thirty grams sulphate of sodium, and twelve grams (180 grains) saccharated carbonate of iron, adding sufficient absolute alcohol to moisten the mass well. Pass the moist mixture through a No. 6 sieve; then separate the finer portions by means of a No. 20 sieve. Dry the coarsely granulated salt which remains after the separation of the fine, using a heat not exceeding 60° C. (140° F.).

Used as a substitute for the natural Vichy water, which is an alkaline water much used in some forms of *kidney* and *bladder affections.*

Dose.—A teaspoonful dissolved in a glass of water and taken during effervescence.

SODII BICARBONATIS TROCHISCI; U. S.

TROCHES OF BICARBONATE OF SODIUM.

Mix thoroughly 19.50 grams (300 grains) bicarbonate of sodium, 58.50 grams (900 grains) finely powdered sugar, and one gram (15 grains) finely powdered nutmeg; then add a sufficient quantity of mucilage of tragacanth, and form a mass of proper consistence. Divide it into one hundred troches.

These troches are identical with those of the old Pharmacopœia (1870).

Sodii Bicarbonas Venalis; U. S.

COMMERCIAL BICARBONATE OF SODIUM.

Description and Tests.—See the Pharmacopœia, p. 295.

Differs from the pure bicarbonate of sodium in that it is allowed to contain small quantities of chloride, sulphate, and carbonate of sodium. At least ninety-five hundredths of this salt must be pure sodium bicarbonate, and it must be of a pure white color and give a clear solution with distilled water.

Sodii Bisulphis; U. S.

BISULPHITE OF SODIUM.

Sodicus Bisulphis—Sodium Bisulphite.

Description and Tests.—See the Pharmacopœia, page 295.

As this salt dissolves in only four times its weight of water, it is to be preferred to the sulphite of calcium, which is frequently prescribed, but which is very difficult to dissolve. Both are used only on account of the sulphurous acid contained in them, which is liberated to a greater or less extent in the body. (See also Magnesii Sulphis.)

New to the Pharmacopœia.

Medicinal Uses.—Like other sulphites this preparation is antiseptic.

Dose.—0.5 to 2 grams (8 to 30 grains).

Sodii Boras; U. S.

BORATE OF SODIUM.

Sodicus Boras—Sodium Borate; Natrum Biboricum, Biboras Natricus, Sodæ Biboras—Borsaures Natron, G.; *Borate de Soude*, F.; *Borato sodico, Borraj*, Sp.; *Borsyradt Natron*, Sw.; *Borax.*

Description and Tests.—See the Pharmacopœia, page 296.

Borax dissolves so slowly in water that it should always be used in the form of powder for solutions.

Medicinal Uses.—It is used as an antacid in cases of uric acid deposits or concretions in the bladder. On account of the boric acid which it contains it is also antiseptic, and is employed in solution as a mouth-wash in *aphthæ* or *thrush*, or the powder may be used as a dressing to foul ulcers, or blown into the external meatus in *otorrhœa*, etc.

It destroys bacteria and other low organisms, and is used as a preservative in curing meats and preserving pathological specimens, for which purposes, however, the boric acid is far more efficient.

Dose.—One to two grams (15 to 30 grains).

Sodii Bromidum; U. S.

BROMIDE OF SODIUM.

Sodicum Bromidum—Sodium Bromide.

Description and Tests.—See the Pharmacopœia, page 296.

Not heretofore official.

Medicinal Uses.—Same as those of bromide of potassium.

Dose.—One to five grams (15 to 75 grains), three to six times a day.

SOLUTION FOR DISPENSING PURPOSES.

Dissolve two hundred grams (7 ounces 24 grains avoirdupois) of the sodium bromide in enough distilled water to make the finished solution measure four hundred cubic centimeters (13½ fluid ounces). Filter.

Each cubic centimeter of the solution contains one-half gram of the salt ; one hundred and five minims contains fifty grains.

Sodii Carbonas ; U. S.

CARBONATE OF SODIUM.

Sodicus Carbonas—Sodium Carbonate.

Description and Tests.—See the Pharmacopœia, page 297.

The official preparation is a good clean grade of the "sal soda" of commerce.

Sal soda is most readily soluble in water at about 38° C. (100.4° F.).

A solution which is saturated at that temperature will deposit crystals above or below that degree.

Sodium carbonate is soluble in about an equal weight of glycerin.

For many pharmaceutical uses it is necessary to have a purer sodium carbonate than the commercial article. Re-crystallization will yield a much purer salt ; but it is extremely difficult to get rid of all the sulphate which contaminates it.

A ten per cent. solution of sodium carbonate has the specific gravity 1.1076.

Used to prepare other preparations of sodium.

SODII CARBONAS EXSICCATUS ; U. S.

DRIED CARBONATE OF SODIUM.

Sodicus Carbonas Exsiccatus—Dried Sodium Carbonate.

Preparation.—See the Pharmacopœia, page 297.

The process is tedious ; yet it is necessary to allow the crushed crystals to effloresce in the air for several days before exposing the salt to a higher heat, because if the crystals are allowed to liquefy (dissolve in the water of crystallization) the subsequent drying will be very difficult.

One gram dried carbonate of sodium is equal to two grams of the crystallized carbonate of sodium.

Medicinal Uses.—Antacid. Seldom given internally.

This medicine is occasionally given in the form of pills, but it is too irritant to be used in this manner and is apt to do harm. As this preparation is, or should be, only used in dilution, it offers no advantage over

the common carbonate of sodium, and should have been dropped from the Pharmacopœia.

Dose.—0.5 to 1 gram (8 to 15 grains) largely diluted.

Sodii Chloras ; U. S.

CHLORATE OF SODIUM.

Sodicus Chloras—Sodium Chlorate ; Natrum Chloricum, Chloras Natricus—Chlorsaures Natron, G.; *Chlorate de Soude*, F.; *Chlorato de Sosa*, Sp.; *Klorsyradt Natron*, Sw.

Description and Tests.—See the Pharmacopœia, page 298.

At ordinary temperatures thirty cubic centimeters (1 fluidounce) water will hold in solution thirty grams (1 ounce 25½ grains) sodium chlorate. A twenty-five per cent. solution has the specific gravity 1.20 at 20° C. (68° F.).

Sodium chlorate is sixteen times as soluble as potassium chlorate, of which one avoirdupois ounce requires one pint of water for its solution at ordinary room temperature.

New to the Pharmacopœia.

Medicinal Uses.—Same as of chlorate of potassium.

Dose.—0.5 to 1 gram (8 to 15 grains).

Sodii Chloridum ; U. S.

SODIUM CHLORIDE.

Sodicum Chloridum—Sodium Chloride ; Chloretum Natricum, Natrium Chloratum, Sal Culinare, Sal Commune, Sal Atticum—Chlornatrium, Kochsaltz, G.; *Chlorure de Sodium, Sel commun*, F.; *Cloruro Sodico, Sal comun*, Sp.; *Klornatrium, Koksalt*, Sw.; *Common Salt, Kitchen Salt, Table Salt.*

Description and Tests.—See the Pharmacopœia, page 298. Pure sodium chloride is prescribed, as seen by the tests. Must be dry, odorless, give a perfectly clear solution with distilled water, and have a pure salt taste free from bitterness. It does not dissolve any better or faster in hot than in cold water. A mixture of eight pounds common salt with twenty-five pounds snow will make a freezing mixture capable of lowering the temperature to −21° C. (−5°.8 F.). A ten per cent. solution of chloride of sodium has the specific gravity 1.07335 ; a twenty per cent. solution the specific gravity 1.15107 ; a twenty-five per cent. solution, 1.19228 ; and a twenty-six per cent. solution has the specific gravity 1.20098. (Gerlach.)

One liter water (34 fluidounces) is capable of dissolving three hundred and fifty grams (12 ounces 150 grains) chloride of sodium.

Uses.—It is a common and important article of diet, being either contained in many articles of food or added as a condiment. Its use is essential to health, if not to life. Seldom employed medicinally. In solution it is given as an antidote in *poisoning with nitrate of silver.* A teaspoonful of dry salt is often beneficial in checking *hemorrhage from the lungs.*

Half an ounce of salt in copious draughts of warm water forms an effective emetic when other emetics are not at hand.

Baths in salt water may prove valuable cutaneous stimulants in some forms of *cachexia,* especially if accompanied by a dry and inactive condition of the skin.

Sodii Citras.

CITRATE OF SODIUM.

A white salt of a pure saline taste, and readily soluble in water. It is used chiefly in the form of solution for pharmaceutical purposes. Taken internally it is a saline purgative, the dose being thirty to sixty grams (1 to 2 ounces).

SODII CITRATIS LIQUOR.

SOLUTION OF CITRATE OF SODIUM.

Dissolve sixty grams (2 ounces 50 grains) citric and enough carbonate of sodium to produce a neutral reaction in a sufficient quantity of water to make the final product measure one hundred and eighty cubic centimeters (6 fluidounces). It will require from one hundred to one hundred and twenty grams carbonate of sodium.

POTIO RIVERI; G.

Dissolve eight grams (124 grains) citric acid in three hundred and eighty grams (nearly 13 fluidounces) of distilled water, and then add gradually eighteen grams (278 grains) carbonate of sodium in crystals. As soon as it is dissolved filter it through a loose plug of absorbent cotton, and bottle at once.

Must be freshly prepared whenever wanted for use.

This preparation is about one-third the strength of the official solution of citrate of potassium.

Medicinal Uses.—Similar to those of solution of citrate of potassium.

Dose.—Thirty to sixty cubic centimeters (1 to 2 fluidounces).

Sodii et Potassii Tartras.

TARTRATE OF SODIUM AND POTASSIUM.

Will be found under the title "Potassii et Sodii Tartras."

Sodii Hypophosphis; U. S.

HYPOPHOSPHITE OF SODIUM.

Sodicus Hypophosphis—Sodium Hypophosphite.

Description and Tests.—See the Pharmacopœia, page 299.

Medicinal Uses.—Similar to those of other hypophosphites, and of phosphates and phosphites. The virtues of the preparation are supposed to depend on the phosphorus which it contains.

Dose.—0.5 to 1.5 gram (10 to 20 grains).

Sodii Hyposulphis; U. S.

HYPOSULPHITE OF SODIUM.

Sodicus Hyposulphis—Sodium Hyposulphite.

Description and Tests.—See the Pharmacopœia, page 299.

Must consist of clear, clean, colorless crystals.

The commercial salt is frequently quite impure.

A ten per cent. solution has the specific gravity 1.0529; a twenty-five per cent. solution, 1.1381; and a fifty per cent. solution, 1.2954.

It is employed in large quantities in photography, and is generally known in the trade as "hypo."

Medicinal Uses.—Powerfully antiseptic. On account of its property of destroying lower organisms it is given internally in *septic* or *zymotic diseases*, *scarlatina*, *diphtheria*, *pyæmia*, *sarcina ventriculi*, etc.; externally, in solution, as a wash to destroy vegetable or animal parasites which give rise to *cutaneous diseases*.

In combination with aconite it is often given in *tonsillitis* and *mumps* to limit inflammation and prevent suppuration. For the latter purpose it is also given in any case of threatened or actually occurring *suppuration*.

Dose.—One gram (15 grains).

SODII HYPOSULPHITIS LOTIO.

A very good antiseptic lotion for cosmetic and other uses is made by dissolving sixty grams (2 ounces) hyposulphite of sodium and three grams (45 grains) pure carbolic acid in one hundred and fifty cubic centimeters (5 fluidounces) glycerin, and then adding one hundred and fifty cubic centimeters (5 fluidounces) rose-water.

Sodii Iodidum; U. S.

IODIDE OF SODIUM.

Sodicum Iodidum—Sodium Iodide; Natrium Iodatum, Iodetum Natricum.

Description and Tests.—See the Pharmacopœia, page 300.

New to the Pharmacopœia.

Medicinal Uses.—Same as of iodide of potassium.

Dose.—One to two grams (15 to 30 grains) several times a day.

Sodii Nitras; U. S.

NITRATE OF SODIUM.

Sodicus Nitras—Sodium Nitrate.

Description and Tests.—See the Pharmacopœia, page 300.

Medicinal Uses.—Slightly laxative. Has been recommended as a remedy in dysentery, but it is very rarely employed.

Its solution has been used as a spray to dissolve croupous or diphtheritic membranes, but with questionable results.

Dose.—Fifteen to sixty grams ($\frac{1}{2}$ to 2 ounces) during the day.

Sodii Phosphas; U. S.

PHOSPHATE OF SODIUM.

Sodicus Phosphas—Sodium Phosphate.

Description and Tests.—See the Pharmacopœia, page 301.

Yields, when strongly heated, a little over thirty-seven per cent. pyrophosphate of sodium.

Should consist of clear (not effloresced) crystals.

Medicinal Uses.—Mild saline purgative. Useful in that form of derangement of the intestinal secretions resulting in offensive greenish discharges. Also used as an antacid, and, like other phosphates, with a view of obtaining the nervine effects of the phosphorus.

Dose.—0.1 to 0.5 gram (2 to 8 grains) for children, best given in milk; to thirty grams (1 ounce) for adults.

Sodii Pyrophosphas; U. S.

PYROPHOSPHATE OF SODIUM.

Sodicus Pyrophosphas—Sodium Pyrophosphate.

Description and Tests.—See the Pharmacopœia, page 301. Obtained from phosphate of sodium by heating.

Not in the old Pharmacopœia. Used only for making other pyrophosphates, especially the pyrophosphate of iron.

Sodii Salicylas; U. S.

SALICYLATE OF SODIUM.

Sodicus Salicylas—Sodium Salicylate.

Description and Tests.—See the Pharmacopœia, pages 301 and 302.

Is frequently of a dirty grayish color. Should be very nearly or quite white, and have an almost neutral reaction.

New to the Pharmacopœia.

Medicinal Uses.—Those of salicylic acid. This salt is better tolerated by the stomach than is the acid.

Dose.—0.3 to 2 grams (5 to 30 grains), several times a day.

Sodii Silicatis Liquor; U. S.

SOLUTION OF SILICATE OF SODIUM.

Water Glass.

A clear, colorless, or pale yellowish, syrupy liquid, which is odorless, but has a sharp salty taste and alkaline reaction. Specific gravity from 1.30 to 1.40, corresponding to from 34° to 42° Baumé.

Must not be caustic to the skin. Should be kept in well-corked bottles.

Used in preparing surgical dressings, by applying to bandages. It is lighter than plaster-of-Paris dressings.

Sodii Sulphas; U. S.

SULPHATE OF SODIUM.

Sodicus Sulphas—Sodium Sulphate; Sal Glauberi—Glauber's Salt.

Description and Tests.—See the Pharmacopœia, page 302.

Must be kept in a cool place.

Medicinal Uses.—An active purgative, formerly much used in some forms of gastric and hepatic troubles, especially if of a catarrhal nature.

Dose.—Fifteen to thirty grams ($\frac{1}{2}$ to 1 ounce), in solution, flavored with syrup of citric acid to moderate its bitterness.

SAL CARLSBADENSE FACTITIUM; Sw.

CARLSBAD SALT.

Artificial Carlsbad salt is very extensively used in Europe. It is made by mixing thirty grams (1 ounce) chloride of sodium, ninety

grams (3 ounces) bicarbonate of sodium, and three hundred grams (1 ounces) sulphate of sodium. All these ingredients must be very thoroughly dried and powdered before being mixed.

Should be kept in a well-corked bottle.

Dose.—Teaspoonful in a glass of water.

Sodii Sulphis; U. S.

SULPHITE OF SODIUM.

Sodicus Sulphis—Sodium Sulphite.

Description and Tests.—See the Pharmacopœia, page 303.

Medicinal Uses.—Same as of the hyposulphite.

Dose.—One to five grams (15 to 75 grains).

Sodii Sulphocarbolas; U. S.

SULPHOCARBOLATE OF SODIUM.

Sodicus Sulphocarbolas—Sodium Sulpho-carbolate.

Description and Tests.—See the Pharmacopœia, page 303.

Medicinal Uses.—Employed internally for the same purposes as carbolic acid. Its action is weaker and less reliable than that of the acid, but it is less irritating.

Dose.—One to two grams (15 to 30 grains).

Sodii Tartras.

TARTRATE OF SODIUM.

Sodicus Tartras—Sodium Tartrate.

A preparation of sodium tartrate is in general use under the name of

SODA POWDERS.

Each soda powder consists of two parts, one being two grams (30 grains) bicarbonate of sodium put up in a blue paper, and the other 1.60 gram (25 grains) powdered tartaric acid in a white paper.

When used the two papers are emptied into a half tumblerful of water, the mixture is stirred hastily and then taken at once.

The preparation was official in the old Pharmacopœia (1870) under the title of "Pulveres Effervescentes."

Medicinal Uses.—Antacid. Used like Seidlitz powders. The carbonic acid which is swallowed during the effervescence of the solution acts as a sedative to the stomach and allays nausea and vomiting.

Solidago.

SOLIDAGO.

Solidaginis Herba—Golden Rod.

Origin.—*Solidago odora*, Aiton (*Compositæ*).

Habitat.—North America.

Parts used.—Leaves and flowering tops.

Description.—The leaves are three to five centimeters (1 to 2 nches) long, entire, sessile, smooth, lanceolate, acute, pellucid-punctate ; he flower-heads are numerous, small, in one-sided racemes ; florets yel- ow, with a bristly down ; odor and taste aromatic, sweet, reminding of nise.

Constituent.—*Volatile oil.*

Medicinal Uses.—Slightly stimulant and carminative. Copious draughts of warm infusion produce diaphoresis, on account of the warm vater taken.

The fluid extract is often used as a flavoring excipient.

Dose.—Two to five grams (30 to 75 grains) best given in FLUID EX- RACT made with diluted alcohol as a menstruum.

SOLIDAGINIS EXTRACTUM.

EXTRACT OF SOLIDAGO.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

Solutiones.

SOLUTIONS.

In many pharmacopœias all solutions of chemicals in water are styled " solutiones " instead of " liquores," as in the United States Pharmaco- pœia. We prefer the title " solutio " as more appropriate and signifi- ant than the vague title " liquor."

Species.

SPECIES.

Teas.

Mixtures of comminuted vegetable drugs intended for making in- usions.

Spigelia; U. S.

SPIGELIA.

Spigeliæ Radix—Pink Root.

Origin.—*Spigelia marilandica*, Linné (*Loganiaceæ*).

Habitat.—The United States.

Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 304.

Spigelia is very dark-colored—almost blackish-gray. Taste bitter, not terebinthinate.

Constituents.—Volatile oil, a bitter substance, resin, etc. Deserves further analysis.

Medicinal Uses.—Spigelia is an anthelmintic employed to expel *lumbrici*, or round worms. Occasionally it acts as a cathartic. If spigelia fails to act on the bowels it may produce narcotic effects, such as pain in the forehead, strabismus, loss of sight, tremor, or even convulsions and death. Such effects may be entirely obviated by giving this remedy in combination with some cathartic, as senna, or jalap, and it should never be administered without such addition. (See "Spigeliæ et Sennæ Extractum Fluidum.")

Dose.—Two to five grams (30 to 75 grains), best given as fluid extract.

SPIGELIÆ EXTRACTUM.

EXTRACT OF SPIGELIA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

SPIGELIÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF SPIGELIA

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and fifty grams (about 5⅝ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidunces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate.* Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

SPIGELIÆ ET SENNÆ EXTRACTUM FLUIDUM; PHAR. 1870.

FLUID EXTRACT OF SPIGELIA AND SENNA.

Fluid Extract of Pink Root and Senna.

Mix one hundred and fifty cubic centimeters (5 fluidounces) fluid extract of spigelia, ninety cubic centimeters (3 fluidounces) fluid extract of senna, 0.65 cubic centimeter (10 minims) volatile oil of anise, and 0.65 cubic centimeter volatile oil of caraway. Shake well.

Used as a vermifuge.

Dose.—About five to ten cubic centimeters (1 to 2 fluidrachms).

SPIGELIÆ INFUSUM.

INFUSION OF SPIGELIA.

From twenty grams (about ⅔ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 fluidounces).

About the same strength as the preparation of 1870.

Dose.—From twenty-five cubic centimeters (6 fluidrachms) for a child of one year, to two hundred and fifty cubic centimeters (½ pint) for an adult.

SPIGELIÆ INFUSUM COMPOSITUM.

COMPOUND INFUSION OF SPIGELIA.

Worm Tea.

Make an infusion of fifteen grams (230 grains) bruised spigelia, ten grams (154 grains) cut senna, ten grams bruised fennel, and thirty grams (460 grains) manna with five hundred cubic centimeters (17 fluidounces) boiling water, macerating until cold.

Dose.—Fifty to one hundred and fifty cubic centimeters (1½ to 5 fluidounces).

Spiritus.

SPIRITS.

At present an indefinite class of preparations, some "spirits" being alcoholic liquids obtained by distillation (brandy, whiskey), while others are solutions of volatile oils in alcohol, and others again are alcoholic solutions of other volatile subtances, as ammonia, ethyl nitrite, etc.

Spiritus Frumenti; U. S.

WHISKEY.

Description and Tests.—See the Pharmacopœia, page 308.

The whiskey of the Pharmacopœia is to be at least two years old. It may be either rye whiskey, Bourbon whiskey (from corn), or whiskey distilled from fermented wheat. It should have a specific gravity of between 0.930 and 0.917, and contain from forty-four to fifty per cent. *by weight* (or fifty to fifty-eight per cent. by volume) of alcohol, showing one hundred to one hundred and sixteen degrees proof on the alcoholometer scale.

Whiskey contains more or less of volatile oils and ethers derived from the grain, and differing according to the kind of grain employed in its manufacture. Thus rye whiskey has a different flavor from Bourbon or corn whiskey.

Amylic alcohol (fusel oil) is a most objectionable impurity in whiskey.

For medicinal purposes it would seem that pure diluted alcohol (neutral spirit) must be far safer and better than whiskey or brandy.

Spiritus Odoratus; U. S.

PERFUMED SPIRIT.

Cologne Water—Eau de Cologne.

The Pharmacopœia gives the following formula for Cologne water for use in sick rooms :

Mix nine hundred and forty cubic centimeters (32 fluidounces) alcohol with two cubic centimeters (½ fluidrachm) acetic ether, sixteen cubic centimeters (½ fluidounce) oil of bergamot, eight cubic centimeters (¼ fluidounce) oil of lemon, eight cubic centimeters oil of rosemary, four cubic centimeters (1 fluidrachm) oil of lavender flowers, and four cubic centimeters oil of orange flowers ; then add one hundred and fifty cubic centimeters (5 fluidounces) water. Shake well. Set aside for a week. Then filter.

The product is a refreshing perfumed spirit. It differs from the best Cologne waters made in not containing oil of neroli, which is a characteristic constituent.

Spiritus Vini Gallici; U. S.

BRANDY.

Cognac.

Description and Tests.—See the Pharmacopœia, page 311.

Pure grape brandy at least four years old is the official article.

It is well understood that the fancy "bouquet" or flavor of the most popular brands of French brandy is altogether artificial—that is, that it is imparted by mixtures of ether added to the distilled brandy.

Good pure grape brandy is now made in California.

Medicinal Uses.—Same as of alcohol.

Dose.—Fifteen to sixty cubic centimeters (½ to 2 fluidounces).

Spongia.

SPONGE.

Schwamm, G.; *Éponge*, F.; *Swamp*, Sw.

Origin.—*Spongia officinalis*, Linné.

Habitat.—The Mediterranean and the Gulf of Mexico.

"Turkey sponges" are the finest, and especially the so-called "cup-sponges." They are imported from the Mediterranean. "Sheep's wool sponges" make excellent bathing sponges, being sometimes of very large size. These two kinds are soft, and are the only ones used for any medicinal purpose. So-called "surgeon's sponges" are cup-shaped Turkey sponges.

Bahama, Florida, and Nassau sponges are more or less hard, harsh, and tear easily. Sand, gravel, and calcareous matter must be carefully removed, and the sponge washed out with clean warm water before it is fit for use.

Sponges are sometimes bleached to improve their appearance; always, however, at the expense of their quality. This is done with solution of chlorinated soda, chlorinated lime, chlorine water, or by sulphurous acid generated from hyposulphite of sodium by the addition of hydrochloric acid. When these agents are used the sponge should afterward be washed in a weak solution of sal soda, then in water slightly acidulated with hydrochloric acid, and finally in a large quantity of hot water. The least objectionable process for bleaching sponges is

to first put them in a solution of permanganate of potassium (20 grams to each liter, or 1 ounce to 3 pints), and afterward in a solution of oxalic acid (also 20 grams to a liter of water, or 1 ounce to 3 pints), to which a little sulphuric acid has been added, the bleached sponge to be afterward thoroughly washed with warm water, and finally dried.

Uses.—Sponges are used mainly for cleansing and washing. If used for cleansing wounds they should be clean new sponges, to avoid the introduction of septic materials into a healthy wound.

"Sponge-grafting" is a process consisting in the introduction of carefully cleaned and disinfected sponge into a cavity or deep ulcer, which must heal by granulation, and has been practised in cases in which the granulations appeared to be weak and flabby, with a tendency to break down. The meshes of the sponge afford support to the forming granulations which surround the sponge, the substance of which is absorbed in the same way as carbolized cat-gut ligatures may be absorbed.

SPONGIÆ CERATÆ.

Sponge-Tents.

Prepared by freeing finely porous sponge from foreign substances, drying it, and cutting it into the required shape, dipping the pieces into melted yellow wax, forcibly compressing them between heated plates, and, when cold, removing the superfluous wax. They may also, and preferably, be made by running a wire or knitting-needle lengthwise through the sponge, then soaking in wax and wrapping with tape or string into a conical shape; when cold, the tape is unwrapped, the wire withdrawn, and the sponge-tent finished by trimming and smoothing with a sharp knife. They are used to dilate the mouth of the womb, sinuses, etc., which is effected by introducing them into the small canal, when they absorb moisture and gradually swell.

SPONGIÆ COMPRESSÆ.

Compressed Sponge.

Made from fine sponge by cutting it into long pieces, moistening these with hot water, then winding them around very tightly with twine, and drying them in that condition, the twine not to be removed until the sponge is to be used.

Used for the same purposes as sponge-tents. They dilate much more rapidly.

SPONGIA USTA.

BURNT SPONGE.

Heat clean dry sponge cut into small pieces in a covered crucible until vapors cease to go off.

The product consists of about forty per cent. carbon, twenty-five to thirty per cent. calcium carbonate, ten per cent. silica, nine per cent. ferrous oxide, about one-half to two per cent. potassium and sodium iodides and bromides, and small quantities of magnesium carbonate, potassium chloride, and calcium phosphate.

Formerly used internally for the same purposes for which the iodides are now given, *goitre*, *glandular enlargements*, etc.

Stannum.

TIN.

The salts are white, generally insoluble in water. The chlorides dissolve in water to which free hydrochloric acid has been added.

Stannous chloride—crystallized "Muriate of Tin"—is used in dyeing. "Solution of Muriate of Tin" (containing the stannic chloride) is also used in dyeing and is made by dissolving the metal in a mixture of hydrochloric and nitric acids.

Stanni Chloridum.

CHLORIDE OF TIN.

Stannicum Chloridum—Stannic Chloride, Muriate of Tin.

A white, crystalline, moist salt, soluble in water acidulated with much hydrochloric acid, but decomposed when brought in contact with water alone. It is very caustic and poisonous.

STANNI CHLORIDI LIQUOR.

SOLUTION OF CHLORIDE OF TIN.

An acid solution of chloride of tin, having a specific gravity of 1.317. It may be made by dissolving one hundred and ten grams (3 ounces 384 grains) crystallized chloride of tin in a mixture of two hundred and forty cubic centimeters (8 fluidounces) hydrochloric acid and twelve hundred and fifty cubic centimeters (44 fluidounces) distilled water.

It is used in dyeing.

Staphisagria; U. S.

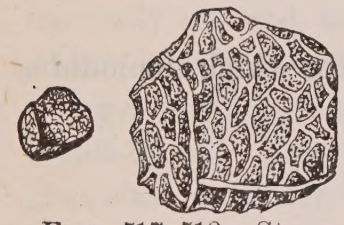
STAPHISAGRIA.

Staphisagriæ Semina—Stavesacre.

Origin.—*Delphinium Staphisagria*, Linné (*Ranunculaceæ*).

Habitat.—Mediterranean countries.

Part used.—The seeds.



FIGS. 517, 518.—Staves-acre, natural size and enlarged.

Description.—See the Pharmacopœia, page 311. See also the figures here given.

Constituents.—The alkaloids *delphinine* and *staphisaine;* also twenty per cent. fixed oil, etc. Delphinine is white, soluble in ether, chloroform, benzol. Staphisaine is yellow, insoluble in ether. Both alkaloids are acrid; very poisonous. The fixed oil is bland when pure, but when extracted from the seeds by means of ether it contains the poisonous alkaloids.

Properties and Uses.—Staphisagria is said to possess diuretic, cathartic, and emetic properties. It has been used externally in prurigo with success. Its principal use is for killing vermin.

STAPHISAGRIÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF STAPHISAGRIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—0.05 to 0.20 cubic centimeter (1 to 3 minims).

Stearinum.

STEARIN.

Tri-stearate of Glyceryl.

The solid part of most fats is chiefly stearin. White, hard, crystalline (in laminæ). It is obtained in a crude state from mutton-suet by removing the olein from it by means of ether. The residue is stearin, with some palmitin.

Stillingia; U. S.

STILLINGIA.

Stillingiæ Radix—Queen's Root, Queen's Delight.

Origin.—*Stillingia sylvatica*, Linné (*Euphorbiaceæ*).

Habitat.—The southern portions of the United States.

Part used.—The root.

Description.—A long root, sometimes as much as five centimeters (2 inches) thick, usually cut in transverse segments of about five centimeters' (2 inches) length; tough, wrinkled, grayish-brown, with thick bark and a porous wood. The inner bark shows numerous resin-cells. Odor disagreeable; taste bitter, acrid.

Constituents.—The only noteworthy constituent is the soft, pungent resin, soluble in alcohol.

Medicinal Uses.—In large doses this drug is an emetico-cathartic, but in smaller doses is said to be a valuable alterative and stimulant of the secretions. It has been used with reputed success in *syphilis*, *scrofula*, and in *hepatic derangements*.

Dose.—One to four grams (15 to 60 grains), in powder, or preferably in the form of fluid extract.

STILLINGIÆ EXTRACTUM.

EXTRACT OF STILLINGIA.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brownish-red.

Dose.—0.05 to 0.2 gram (1 to 3 grains) three times a day.

STILLINGIÆ EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF STILLINGIA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with one hundred and fifty grams (about 5⅝ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

STILLINGIÆ EXTRACTUM FLUIDUM COMPOSITUM.

Compound Fluid Extract of Stillingia.

Mix one hundred and thirty grams (4 ounces 255 grains) stillingia, one hundred and thirty grams corydalis, sixty grams (20 ounces 50 grains) chimaphila, sixty grams iris versicolor, sixty grams sambucus, thirty grams (1 ounce 25 grains) xanthoxylum berries, and thirty grams coriander, all reduced to No. 30 powder.

As a menstruum use diluted alcohol.

Make five hundred cubic centimeters (17 fluidounces) finished fluid extract.

Used in syphilis, scrofula, etc., generally in combination with potassium iodide.

Dose.—Five to ten cubic centimeters (1 to 2 fluidrachms).

STILLINGIÆ SYRUPUS COMPOSITUS.

Compound Syrup of Stillingia.

Mix thirty cubic centimeters (1 fluidounce) compound fluid extract of stillingia with ninety cubic centimeters (3 fluidounces) simple syrup.

Dose.—Five to thirty cubic centimeters (1 to 8 fluidrachms).

Stramonii Folia; U. S.

Stramonium Leaves.

Thornapple, Stinkweed, Jimsonweed, E.; *Stechapfel*, G.; *Stramoines*, F.

Origin.—*Datura Stramonium*, Linné (*Solanaceæ*).

Habitat.—North America, Europe, and most other countries.

Description.—See Fig. 519. They retain their green (or grayish-green) color better than belladonna, hyoscyamus, and tobacco. The sides of the leaf and the venation are generally unsymmetrical. The lateral veins proceed from the midrib at a sharp angle without first

running parallel with it. They are much wrinkled and broken, so that they can hardly be recognized except by the above signs in connection with the disagreeable narcotic odor developed by rubbing the leaves. Without rubbing or powdering the drug is inodorous ; the taste is bitter and nauseous.

Constituents.—From two one-hundredths to three one-hundredths

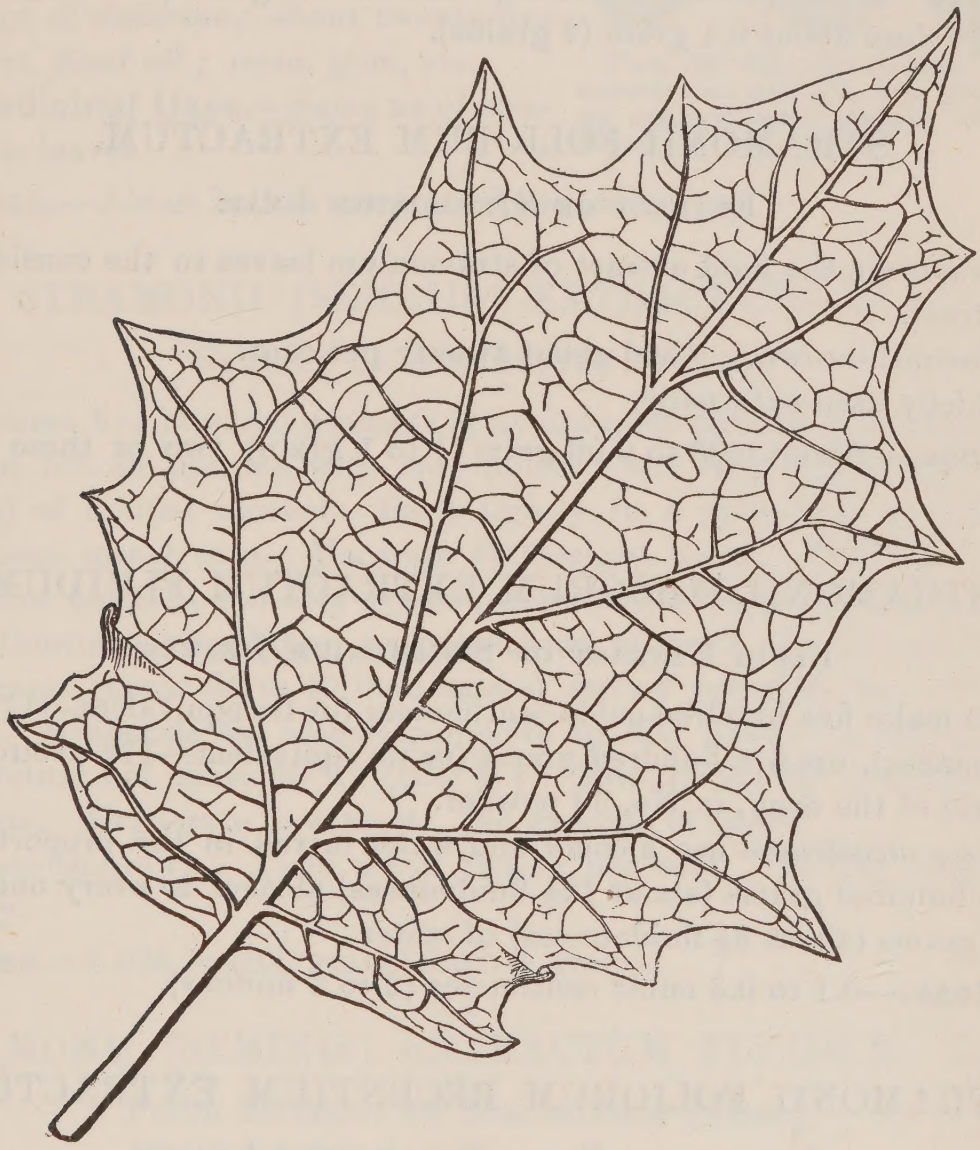


FIG. 519.—Stramonium Leaf, half size.

per cent. of the alkaloid *daturine*, which is closely allied to *atropine*, and has the same medicinal properties, but is twice as strong.

Medicinal Uses.—Stramonium leaves may be used as an anodyne narcotic and a hypnotic, in *spasmodic* and *painful affections;* such as *neuralgia*, *spasmodic cough*, or *asthma*, etc. Externally the powdered leaves are often applied as an anodyne poultice.

But the most valuable action of stramonium is the power it possesses

of relieving *spasmodic asthma* when smoked. For this purpose about one gram (15 grains) of the dried leaves are mixed with tobacco and smoked in a pipe, or cigarettes or cigars may be soaked in a strong decoction of stramonium leaves and then dried. In this form they may be preserved until wanted for use.

Externally they are used as anodyne poultices or fomentations.

Dose of the powdered leaves, 0.05 to 0.3 gram (1 to 5 grains); average dose about 0.1 gram (2 grains).

STRAMONII FOLIORUM EXTRACTUM.

Extract of Stramonium Leaf.

Evaporate the fluid extract of stramonium leaves to the consistence of extract.

Greenish-brown. Yield about twenty per cent.

Chiefly used externally.

Dose.—About 0.03 to 0.06 gram ($\frac{1}{2}$ to 1 grain), two or three times a day.

STRAMONII FOLIORUM EXTRACTUM FLUIDUM.

Fluid Extract of Stramonium Leaves.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17$\frac{2}{3}$ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12$\frac{1}{2}$ fluidounces) alcohol to every one hundred grams (about 3$\frac{1}{3}$ fluidounces) of water.

Dose.—0.1 to 0.3 cubic centimeter (2 to 5 minims).

STRAMONII FOLIORUM RECENTIUM EXTRACTUM.

Extract of Fresh Stramonium Leaves.

Bruise fresh stramonium leaves in a stone mortar, press out the juice, heat it gradually to 55° C. (131° F.), and separate the chlorophyll (green coloring matter) by means of a muslin strainer. Evaporate the strained liquid to a syrupy consistence. Then reincorporate the chlorophyll and evaporate the whole to a soft extract.

This extract makes a handsome-looking ointment, but not the official stramonium ointment, which is made from the extract of stramonium seed.

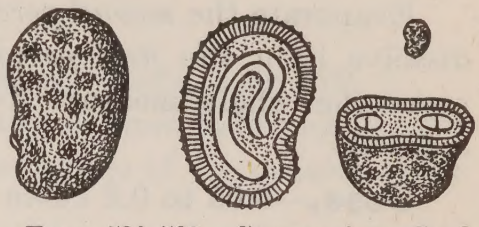
Stramonii Semen; U. S.

STRAMONIUM SEED.

Description.—See illustrations. Brownish-black; internally whitish and oily; inodorous; bitter.

Constituents.—About one-tenth per cent of *daturine;* about twenty-five per cent. *fixed oil;* resin, gum, etc.

Medicinal Uses.—Same as of stramonium leaves.



FIGS. 520–523.—Stramonium Seed, natural size, enlarged, and longitudinal and transverse sections, both enlarged.

Dose.—About half as much as of the leaves.

STRAMONII [SEMINIS] EXTRACTUM; U. S.

EXTRACT OF STRAMONIUM [SEED].

Moisten five hundred grams (17⅔ avoirdupois ounces) of stramonium seed, in No. 30 powder, with one hundred and fifty grams (5⅝ fluidounces) of diluted alcohol. Pack tightly in a cylindrical percolator. Add more menstruum. Macerate forty-eight hours. Percolate. Reserve four hundred and fifty grams (about 16 fluidounces) of *first percolate.* Continue percolation to exhaustion, or until one thousand and fifty grams (about 36 to 40 fluidounces) *second percolate* has been received. Evaporate the second percolate to fifty grams (1⅔ ounce) at a temperature not above 50° C. (122° F.). Mix the residue with the first percolate. Evaporate to extract. No glycerin is added.

Greenish-brown. Yield about twelve per cent. Chiefly used externally.

Dose.—0.025 to 0.03 gram (about ½ grain).

STRAMONII [SEMINIS] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF STRAMONIUM [SEED].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of three hundred grams (about 12½ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred grams (about 4 fluidounces) of the *menstruum.* Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate.* Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.05 to 0.2 cubic centimeter (1 to 3 minims).

STRAMONII [SEMINIS] TINCTURA; U. S.

TINCTURE OF STRAMONIUM [SEED].

Moisten thirty grams (1 ounce) stramonium seed, in No. 40 powder, with thirty cubic centimeters (1 fluidounce) diluted alcohol. Macerate twenty-four hours. Then pack it tightly into a cylindrical percolator and percolate with diluted alcohol until three hundred cubic centimeters (10 fluidounces) of tincture has been obtained.

This tincture is thirty-three per cent. weaker than the corresponding preparation of the Pharmacopœia of 1870.

It is brown by transmitted light, with a greenish fluorescence by reflected light.

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

STRAMONII UNGUENTUM; U. S.

STRAMONIUM OINTMENT.

Triturate three grams (46 grains) extract of stramonium seed with 1.50 gram (23 grains) water until reduced to a uniform soft paste; then gradually mix with it 25.50 grams (394 grains) benzoinated lard.

This ointment is brown. The old Pharmacopœia (1870) did not state whether extract of stramonium leaves or extract of stramonium seed should be used in making the stramonium ointment. We believe that the extract of stramonium leaves was the one most used.

Strontium.

STRONTIUM.

One of the alkaline earth metals, the salts of which are many of them insoluble in water, resembling closely the salts of barium. Nitrate and chloride are soluble.

The nitrate is much used in the preparation of "red Bengal light."

Strychnina; U. S.

STRYCHNINE.

Strychnia.

Description and Tests.—See the Pharmacopœia, page 312.

This extremely poisonous alkaloid is obtained from both nux vomica and ignatia, and has also been found in other plants of the natural order *Loganiaceæ.*

Medicinal Uses.—Same as of nux vomica, the action of which depends on the strychnine which it contains.

Strychnine is intensely bitter, and is used in small doses as a bitter tonic. In larger, but still medicinal, doses, it is a motor excitant, and is used in cases of *paralysis* to stimulate the muscles involved. Its most beneficial action is exerted when the paralysis is due to want of exercise, as in a fractured limb after the bandages are removed; or in *peripheral paralyses*, as in cases of chronic lead or mercury poisoning, or after diphtheria, etc. When the paralysis is due to cerebral troubles, the administration of strychnine is seldom of use, and often productive of harm.

In *chronic constipation* due to atonic conditions of the bowels, or in *incontinence of urine* from want of tone in the vesical sphincter, nux vomica (or strychnine) is often of marked benefit.

It is used as an antidote in poisoning from chloral hydrate.

Poisonous Effects.—When given in excessive doses strychnine is a powerful poison, acting on the spinal cord and nerves and causing violent tetanoid contractions of the muscles. If death occurs it is due to asphyxia, owing to the inability of the patient to exhale, the muscles of respiration remaining fixedly contracted.

Antidotal treatment consists in prompt evacuation of the stomach and the administration of chemical or physiological antidotes. Tannic acid has been used as a chemical antidote, but the physiological antidotes, tobacco, chloral, inhalations of chloroform or of ether, etc., promise more favorable results.

Dose.—0.001 to 0.003 gram ($\frac{1}{60}$ to $\frac{1}{20}$ grain).

STRYCHNINÆ OLEATUM.

OLEATE OF STRYCHNINE.

Dissolve two grams (31 grains) strychnine in ninety-eight grams (1,469 grains) oleic acid by triturating them together in a mortar.

Contains two per cent. strychnine.

Applied externally for *local paralyses*, etc.

Strychninæ Acetas.

ACETATE OF STRYCHNINE.

Small white crystals, soluble in sixty parts of water.

Dose.—0.001 to 0.005 gram ($\frac{1}{60}$ to $\frac{1}{12}$ grain).

Strychninæ Nitras.

NITRATE OF STRYCHNINE.

White, or colorless, shining crystals, permanent in the air. Soluble in sixty parts water.

Dose.—0.001 to 0.005 gram ($\frac{1}{60}$ to $\frac{1}{12}$ grain).

Strychninæ Sulphas; U. S.

SULPHATE OF STRYCHNINE.

Description and Tests.—See the Pharmacopœia, page 313.

Probably the most uniform, permanent, and readily soluble of all the strychnine salts.

Medicinal Uses.—The most frequently employed salt of strychnine.

Dose.—0.001 to 0.005 gram ($\frac{1}{60}$ to $\frac{1}{12}$ grain).

Styrax; U. S.

STORAX.

Styracibalsamum, Styracis Balsamum; Styrax Liquidus—Liquid Storax.

Origin.—*Liquidambar orientalis*, Miller (*Hamamelaceæ*).

Habitat.—Asia Minor.

Description.—See the Pharmacopœia, page 313.

It is a true balsam.

Constituents.—*Styrol, cinnamic acid, styracin*, and other cinnamic ethers, resin, etc.

Medicinal Uses.—Stimulant, blennorrhetic, and expectorant.

Dose.—About one gram (15 grains) several times a day.

STYRACIS TINCTURA COMPOSITA.

COMPOUND TINCTURE OF STORAX.

Turlington's Balsam.

Digest for ten days two grams (30 grains) angelica root, four grams (60 grains) powdered myrrh, four grams socotrine aloes, eight grams

(123 grains) balsam of Peru, fifteen grams (230 grains) balsam of Tolu, fifteen grams storax, fifteen grams powdered extract of glycyrrhiza, and forty-five grams (1½ ounce) powdered benzoin with one thousand cubic centimeters (34 fluidounces) alcohol. Strain and filter.

Used externally as an application to cuts and bruises.

Succi.

JUICES.

There were formerly used several "juices" from fresh plants. The fresh drug was bruised, the juice then forcibly expressed and mixed with a certain quantity of alcohol. The addition of the alcohol served to precipitate gum, pectin, and albuminous matters, and to preserve the preparation. They could not but be crude, variable preparations.

Succinum.

AMBER.

Origin.—A fossil from *Pinites succinifer*, Gæppert (*Coniferæ*), now extinct.

Geographical Source.—Southern shores of the Baltic.

Description.—Irregular pieces, usually rough on the surface. Yellowish, brownish, reddish, and from opaque to transparent. Fracture glossy. Inodorous and tasteless. Melts when heated and gives off fragrant vapors of succinic acid and volatile oil. Soluble in chloroform, and to a limited extent in alcohol, ether, and volatile oils.

Constituents.—Succinic acid and resin.

Not used medicinally in this form. Pieces of amber formerly shared the reputation of the potato or buckeye, of warding off rheumatism, etc., if carried in the pockets.

Succini Oleum; U. S.

OIL OF AMBER.

Rectified Oil of Amber.

Prepared by distillation from the empyreumatic oil of amber (see Succini Pyroleum).

Description.—See the Pharmacopœia, page 243.

Medicinal Uses.—Stimulant, antispasmodic. Has been used in *convulsions*, *epilepsy*, *hysteria*, etc. Also in *amenorrhœa*.

Dose.—Five to ten drops.

Succini Pyroleum.

EMPYREUMATIC OIL OF AMBER.

Crude Oil of Amber.

A dark brown, somewhat thick, empyreumatic liquid, having a greenish fluorescence. Odor disagreeable, persistent, smoky, aromatic. It is lighter than water (specific gravity 0.86 to 0.93), has a neutral or only slightly acid reaction, and is soluble in alcohol.

Constituents.—Several fatty acids, resins, volatile oil, etc.

LINIMENTUM BRITANNICUM.

BRITISH OIL.

This is a mixture, formerly very complicated, now usually prepared from equal parts of crude oil of amber, lubricating oil (or crude petroleum), turpentine, and flaxseed oil.

Used in sprains and bruises.

Sulphur.

SULPHUR.

Schwefel, G.; *Soufre*, F.; *Svafvel*, Sw.; *Brimstone*, E.

A large portion of the sulphur of commerce is obtained by roasting iron pyrites. The sulphur is cast in moulds, either into cylindrical sticks, or square blocks, or cakes.

Brimstone is hard and brittle, light-yellow, has a faint peculiar odor, especially when rubbed, and no taste. Melts at 113 to 113.5° C. (235.4° to 236° F.). One hundred grams carbon bisulphide will at 15° C. (59° F.) dissolve thirty-seven grams sulphur, and at 55° C. (131° F.) 181.34 grams. It dissolves sparingly in oil of turpentine, chloroform, benzol, ether, acetic acid, and in fixed and volatile oils. Burns with a blue flame, sulphurous acid fumes being formed.

Sulphurous acid gas being a powerful disinfectant, burning sulphur is used for fumigating infected ships, houses, and confined spaces generally.

Sulphur Lotum; U. S.

WASHED SULPHUR.

Sublimed sulphur usually has an acid taste and reaction from adhering sulphuric acid. To remove this and any arsenical compounds it is washed with water, to which has been added a little water of ammonia,

as prescribed under the title Sulphur Lotum in the Pharmacopœia, page 314.

Must be well dried, as it may otherwise become acid again.

Description and Tests.—See the Pharmacopœia, page 315.

Medicinal Uses.—When taken internally it acts as a mild laxative, producing soft, pulpy stools. It is often given, alone or in combination with cream of tartar and senna, in *piles* and other diseases of the rectum.

Externally it is often applied in ointment as a cure for *itch* and some other forms of skin disease. It has been claimed that sulphur ointment cures itch by the *fat* filling the breathing pores of the insects and thus asphyxiating them.

Dose.—As a laxative, five to fifteen grams (1 to 4 fluidrachms).

SULPHURIS CONFECTIO.

Confection of Sulphur.

Mix forty grams (1 ounce 180 grains) washed sulphur, ten grams (154 grains) bitartrate of potassium, and a sufficient quantity of syrup of orange peel to make a thick paste (say about 30 cubic centimeters, or 1 fluidounce).

Dose.—Tablespoonful or more.

SULPHURIS UNGUENTUM ALKALINUM; U. S.

Alkaline Sulphur Ointment.

Triturate thirty grams (1 ounce) washed sulphur and fifteen grams (½ ounce) carbonate of potassium with 7.50 cubic centimeters (2 fluidounces) water until well mixed. Then add gradually 97.50 grams (3¼ ounces) benzoinated lard, and mix the whole thoroughly.

Used as an itch cure.

SULPHURIS UNGUENTUM SAPONATUM.

Sulphur and Green Soap.

Itch Ointment.

Triturate together one hundred grams (3 ounces 230 grains) washed sulphur and three hundred grams (10 ounces 255 grains) green soap, until homogeneously mixed. Then add boiling water gradually, continuing the trituration, until the mixture has a uniform, soft, jelly-like but plastic consistence.

Sulphur Præcipitatum; U. S.

Precipitated Sulphur.

Lac Sulphuris—Milk of Sulphur.

Preparation, Description and Tests.—See the Pharmacopœia, page 315. It is probably never made except by manufacturers.

Must be odorless and entirely soluble in a boiling solution of soda or in disulphide of carbon.

Is frequently contaminated with large quantities of calcium sulphate owing to a defective and careless method of manufacture.

Used like washed sulphur.

Sulphur Sublimatum; U. S.

Sublimed Sulphur.

Flores Sulphuris—Flowers of Sulphur.

Description.—See the Pharmacopœia, page 316.

Should be nearly dry, and not have a too strongly perceptible acid taste.

Used in ointments. For internal use the washed sulphur only should be employed.

SULPHURATUM OLEUM.

Sulphurated Oil.

Balsam of Sulphur.

Boil six hundred grams (21 ounces) flaxseed oil with 100 grams (3½ ounces) sublimed sulphur in an iron kettle, stirring constantly, until a uniform liquid is obtained, being cautious in regulating the heat so that the mixture may not boil over.

A thick, reddish-brown liquid, wholly soluble in oil of turpentine.

Used externally.

SULPHURATUM OLEUM TEREBINTHINATUM.

Haarlem Oil.

Mix thirty-four grams (1 ounce 88 grains) sulphurated oil, eleven grams (170 grains) crude petroleum, seventeen grams (260 grains) crude oil of amber, forty-six grams (1 ounce 270 grains) flaxseed oil, and ninety-two grams (3 ounces 106 grains) oil of turpentine.

Used as a liniment.

SULPHURIS UNGUENTUM; U. S.

SULPHUR OINTMENT.

Mix thoroughly thirty grams (1 ounce 25 grains) sublimed sulphur with seventy grams (2 ounces 205 grains) benzoinated lard.

SULPHURIS UNGUENTUM COMPOSITUM.

COMPOUND SULPHUR OINTMENT.

Mix thoroughly ten grams (154 grains) precipitated carbonate of calcium, fifteen grams ($\frac{1}{2}$ ounce) sublimed sulphur, fifteen grams purified tar, thirty grams (1 ounce) green soap, and thirty grams lard.

Sulphuris Iodidum; U. S.

IODIDE OF SULPHUR.

Sulphuricum Iodidum—Sulphur Iodide.

Preparation, Description, and Tests.—See the Pharmacopœia, page 314. It is not probable that it is ever made except by manufacturers.

Medicinal Uses.—Rarely employed internally. Has been given in various *skin diseases*, *eczema*, *lupus*, *lepra*, *acne*, etc. More frequently used externally in the form of ointment.

Dose.—0.06 to 0.25 gram (1 to 4 grains).

SULPHURIS IODIDI UNGUENTUM.

OINTMENT OF IODIDE OF SULPHUR.

Mix thoroughly two grams (30 grains) iodide of sulphur and thirty grams (1 ounce) lard.

Sumbul; U. S.

SUMBUL.

Musk Root.

Origin.—*Ferula Sumbul*, Hooker, filius (*Umbelliferæ*).

Habitat.—Asia.

Part used.—The root.

Description.—See the Pharmacopœia, page 316. Thick, irregular pieces, usually transverse segments, but often also sliced lengthwise; externally blackish-gray; interiorly the root is grayish or whitish.

Constituents.—About one-third per cent. of a bluish volatile oil, nine per cent. soft resin, angelicic and valerianic acids, etc.

False sumbul is ammoniacum root. It has a reddish or yellow hue, and is not light or porous.

Medicinal Uses.—Occasionally employed as a stimulant blennorrhetic in *chronic bronchitis, leucorrhœa,* etc. Also used as a nervine in *hysteria.*

Dose.—0.5 to 4 grams (8 to 60 grains), in powder.

SUMBUL EXTRACTUM FLUIDUM.

FLUID EXTRACT OF SUMBUL.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Dose.—One to four cubic centimeters (15 to 60 minims).

SUMBUL TINCTURA; U. S.

TINCTURE OF SUMBUL.

Moisten thirty grams (463 grains) sumbul, in No. 30 powder, with thirty cubic centimeters (1 fluidounce) alcohol. Macerate twenty-four hours. Then pack it firmly in a cylindrical percolator and percolate with alcohol until three hundred grams (or 10 ounces, measuring 12 fluidounces) of tincture has been obtained.

Dose.—Two to ten cubic centimeters (½ to 2½ fluidrachms).

Suppositoria; U. S.

SUPPOSITORIES.

The general formula, given on page 316 of the Pharmacopœia, prescribes the use of pure oil of theobroma (cacao butter) in making suppositories. It also gives preference to the use of moulds instead of forming the suppository by hand. Well made, in proper moulds, the suppositories look glossy and handsome; but we prefer mixing the medicament with finely shaved oil of theobroma on a board lightly dusted with lycopodium or starch, using a spatula to work the mass together into a uniform and smooth mixture, which can very readily be rolled on the board under the spatula into cylindrical rolls, which are then cut into the required number of equal parts, each of which is afterward formed, also with the spatula, into proper shape.

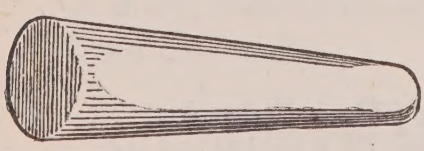


FIG. 524.—Suppository, natural size.

By adopting this method, which requires but little practice, we avoid the use of heat for melting the oil, and also the troublesome and tedious use of suppository moulds set in ice, and from which the suppositories are not always easily removed. Suppositories so made can be obtained of as perfect form as those made in moulds ; but are not glossy on the surface. When melted and poured into moulds the suppositories are not always uniform throughout ; but heavy substances are liable to sink to the apex of the mould before solidification takes place.

Suppositories when dispensed should be neatly placed between layers of cotton-wadding in the box which is to contain them.

Symphytum.

SYMPHYTUM.

Symphyti Radix—Comfrey.

Origin.—*Symphytum officinale*, Linné (*Boraginaceæ*).

Habitat.—Europe and the United States.

Part used.—The root.

Description.—About fifteen centimeters (6 inches) long, and eight to twenty millimeters ($\frac{1}{3}$ to $\frac{4}{5}$ inch) thick, tough, wrinkled, brownish-

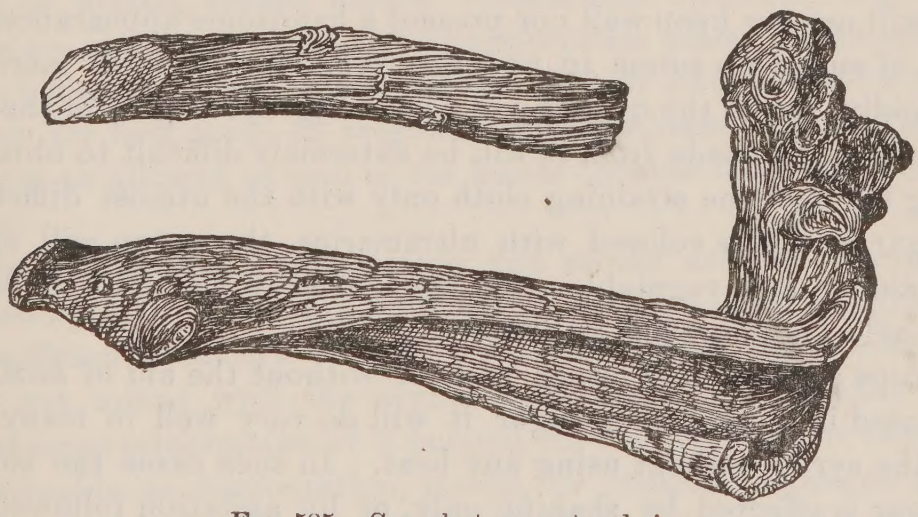


FIG. 525.—Symphytum, natural size.

black, somewhat twisted, often split ; internally whitish, or grayish-white ; bark thick. Odorless ; taste sweetish, mucilaginous, slightly astringent.

Constituents.—A large amount of mucilage, some *asparagin*, and traces of tannin.

Medicinal Uses.—Demulcent and slightly astringent, and used in *diarrhœa*, *dysentery*, *pulmonary affections*, *leucorrhœa*, and other relaxed conditions of mucous membranes.

Externally the fresh root, bruised, is used as an application to *bruises, fresh wounds, sore* or *chapped nipples*, etc.

Dose.—Five to ten grams (75 to 150 grains), in decoction.

Syrupi.

SYRUPS.

Syrupe, G.; *Sirops*, F.; *Jarabe*, Sp.; *Syruper*, Sw.

These are liquid preparations, containing large quantities of sugar—generally from sixty to sixty-five per cent. The object of adding the sugar is chiefly to preserve aqueous solutions of vegetable constituents from change, but it also serves the purpose of rendering the medicine much less disagreeable to take. Children can take medicines in the form of syrup much better than in any other form.

As a rule, syrups should be perfectly clear, and free from mould or any signs of fermentation.

Preparation.—The *liquid* from which the syrup is to be made must be perfectly clear, and should be filtered if need be. Simple syrup ought always to be made from distilled water. If these precautions are taken the syrups will not only be clear, but will keep much better and longer.

The *sugar* must be the purest that can be obtained; otherwise the syrup will neither keep well nor present a handsome appearance. Cheap grades of sugar are prone to undergo fermentation much more readily and rapidly, and if the quantity of glucose (grape sugar) in the sugar is great, the syrup made from it will be extremely difficult to obtain clear, passing through the straining cloth only with the utmost difficulty. If the sugar used was colored with ultramarine, the syrup will, especially if containing any vegetable acids, soon acquire the odor of hydrosulphuric acid (sulphuretted hydrogen).

Syrups are prepared either with or without the aid of *heat*. If the sugar used is the best cut sugar it will do very well in many cases to make the syrup without using any heat. In such cases the solution of the sugar is effected by shaking only, or by agitation followed by percolation, or by percolation alone, or by displacement. The advantages gained by avoiding the use of heat are that volatile and unstable compounds contained in the preparation are not volatilized or injured, and that no grape sugar can then be formed during the process, which would detract from the keeping qualities of the preparation. Syrup made by boiling, even if the purest sugar be used, may, after standing a short time, be found to contain grape sugar.

On the other hand, vegetable juices and extracts, and certain other vegetable constituents entering into medicated syrups, may contain, or

constitute, or give rise to ferments, which will induce decomposition ; and in numerous instances all danger from this source is effectively obviated by bringing the syrup to the boiling point before straining. The boiling separates some and destroys others of the substances liable to ferment or induce fermentation. A majority of the syrups containing vegetable constituents will neither be clear nor keep well unless treated in this way.

It is, therefore, necessary to exercise intelligent judgment in choosing between the two processes. In many cases it is easy enough to decide which course to pursue, and in all cases of doubt we would recommend that the sugar be dissolved by agitation, and that the syrup be then brought to the boiling point as rapidly as practicable, and strained while hot.

Sometimes it is necessary to *skim* the syrup when made by heat. This is the case in many of the fruit syrups, and the occasion for it (the rising of froth and scum) will be readily recognized in each case.

For *straining* syrups the best medium is thin, nearly all wool flannel.

As to the vessels most suitable for boiling syrups, porcelain evaporating dishes or capsules are best when the quantities are small. The loss of water by evaporation should be made up by the addition of sufficient boiling distilled water. Granite-iron kettles, enamelled iron dishes or kettles, tinned copper vessels, and untinned bright copper kettles are also used, each in their appropriate place. Fruit-syrups cannot be boiled in tinned copper vessels, as their color would be ruined by it ; they are best made in bright-scoured untinned copper kettles, but must not be allowed to cool in the kettle because they will then contain copper.

Preservation.—Fermentation and mould are the changes to be guarded against. They are induced by ferments, bacteria, grape-sugar, an insufficient quantity of sugar, the presence of organic acids, or of water not mixed with the syrup. An insufficient quantity of water may cause crystallization of a portion of the sugar ; but this is not as objectionable as fermentation, mould, or chemical changes generally. The sugar is the preservative agent in syrups ; but, as already shown, it is preservative only in proportion to its purity. Among other preservative substances which enter into some syrups are volatile oils, alcohol, inorganic acids, metallic salts, etc. Although in some cases where these or other preservative agents are present it may be sufficient to add only fifty to sixty per cent. of sugar, in most syrups sixty-four to sixty-five per cent. is required, and the quantity prescribed in the official syrups of the Pharmacopœia of the United States is sixty-five per cent. In warm countries and in summer less than that proportion of sugar will

be unsafe. In Norway, on the other hand, the pharmacopœial syrups contain only sixty per cent. of sugar, which is there found sufficient.

As soon as a syrup has been finished it should be bottled while hot (if made by heat), in dry bottles (preferably not larger than pint bottles), which must be filled up to the neck, and, after the syrup has become cool, must be tightly corked with sound, fine, selected corks. The necks of the bottles may then be dipped into melted paraffine or wax. After they have become quite cool, the filled bottles must be shaken up once, so as to incorporate with the syrup any water which may have formed by the condensation of vapors from the warm syrup in the necks of the bottles. They are then to be kept in the cellar or other cool place.

Fermentation will be effectually prevented if these precautions are all duly observed. Even lose cotton plugs in the necks of the bottles are sufficient if all other conditions are fulfilled.

Mould, however, may not be always prevented by these means, especially if organic acids are contained in the syrup, and it be long kept. Hence syrups should not be made in large quantities, but should be made fresh every two or three months if practicable.

Restoration.—When a medicated syrup ferments, it is not the sugar alone that undergoes decomposition, especially if the constituents are of vegetable origin. These constituents are more or less injured, if not destroyed, and the preparation becomes turbid and unsightly as well as medicinally damaged. Neither the physician nor the patient would be satisfied to have such a preparation dispensed, even if the signs of fermentation have been previously removed.

Medicinal syrups in which signs of fermentation have made their appearance cannot by any means be "restored" (?), so as to be as good as when fresh; in fact, they are only fit to be thrown away.

Flavoring syrups, or fruit syrups, may perhaps, when they have just begun to ferment, be improved, so as to be fit for some purposes, by bringing them to the boiling point, removing the froth, straining and rebottling.

The addition to medicinal syrups of alcohol, sulphite of calcium, salicylic acid, etc., to preserve them is altogether inadmissible.

Syrupus; U. S.

SYRUP.

Syrupus Simplex, Syrupus Sacchari — *Simple Syrup*, E.; *Weisser Syrup*, G.; *Sirop de Sucre, Sirop simple*, F.; *Jarabe Simple*, Sp.; *Sockersyrup*, Sw.

Preparation.—Dissolve sixty-five parts, by weight, of sugar in thirty-five parts distilled water. Raise the temperature of the solution

to the boiling point, and strain while hot. Finally add enough boiling distilled water to make the final product weigh one hundred parts.

Strength.—This simple syrup, it will be observed, contains exactly sixty-five per cent. of sugar by weight. It is a trifle weaker than the syrup of the Pharmacopœia of 1870, which contained 65.45 per cent. sugar, and a trifle stronger than the syrup of the German Pharmacopœia, which contains 64.3 per cent.

Practically fifteen pounds of sugar to each gallon of distilled water will make the official syrup. The exact proportions are thirteen pounds sugar to seven pounds distilled water.

Relation of Weight to Volume.—The specific gravity of simple syrup, made according to the new Pharmacopœia, is 1.310. In other words, one thousand cubic centimeters of it will weigh thirteen hundred and ten grams. One gallon weighs ten pounds fourteen and two-third ounces avoirdupois.

One thousand grams simple syrup measures 763.36 cubic centimeters; one thousand avoirdupois ounces measures $732\frac{83}{100}$ fluidounces (about $45\frac{4}{5}$ pints).

Quantities of Materials required to make Specified Quantities of Syrup.—To make one thousand cubic centimeters of syrup, use eight hundred and fifty-one and a half grams (30 ounces 16 grains) sugar, and four hundred and fifty-eight and a half cubic centimeters ($15\frac{5}{8}$ fluidounces) of distilled water.

To make one gallon use seven pounds one and a half ounce of sugar, and three pints ten and three-fourths fluidounces distilled water.

To make forty-five and four-fifths gallons, use three hundred and twenty-five pounds sugar and twenty-one gallons distilled water.

Increase of Volume of Liquid by Sugar added.—When sugar is dissolved in water each kilogram (1,000 grams) of sugar in the solution occupies the space of six hundred and thirty-six cubic centimeters. When one thousand avoirdupois ounces of sugar is added to any liquid, elixir, or mixture, the bulk of the liquid will be thereby increased by six hundred and ten and one-half U. S. fluidounces; or, in other words, one thousand grains of sugar in solution measures one ounce, two drachms, and ten and a half minims U. S. fluid measure.

Used for flavoring mainly.

FRUIT SYRUPS.

Among the finest fruit syrups for use in preparing pleasant mixtures at the prescription counter, for making delicious summer drinks and refreshing drinks for the sick, as well as for the soda fountain, the follow-

ing deserve and have the preference, viz. : Raspberries, strawberries, cherries, blackberries, red and white currants, grapes, orange, lemon, and pine-apple. Natural syrups—that is, syrups prepared from the juice of the fresh fruit at the proper season—are the only fruit syrups fit to use. Artificially prepared syrups, made with so-called fruit essences, are always vastly inferior to the genuine, and in most cases they are simply abominable.

The working formula we give for Rubi Idæi Syrupus will serve as a reliable model for all the others.

Tabacum ; U. S.

TOBACCO.

Nicotianæ Folia—*Tabaks-blätter*, G.; *Tabac, Nicotiane*, F.; *Nicociana*, Sp.; *Tobak*, Sw.; *Leaf Tobacco.*

Origin.—*Nicotiana Tabacum*, Linné (*Solanaceæ*).

Habitat.—Cultivated, especially in subtropical and temperate zones.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 331.

Virginia tobacco, and Cuban tobacco are most esteemed.

Constituents.—From two to ten per cent. of the extremely acrid poisonous alkaloid *nicotine*, besides nicotianin, resin, extractive, etc.

Medicinal Uses.—This remedy is a powerful depressant and poison, reducing the heart's action and producing collapse and even death. It should not be employed except in such apparently hopeless cases as strychnine poisoning and tetanus, in which the desperate condition justifies desperate remedies.

The smoking of a cigar occasionally gives relief in asthma, especially if the patient is not an habitual smoker.

TABACI ENEMA ; B.

ENEMA OF TOBACCO.

Infuse 1.30 gram (20 grains) leaf tobacco in two hundred and forty cubic centimeters (8 fluidounces) of boiling water for half an hour and strain the infusion.

Intended for one enema, but is an excessive dose (see below).

This preparation has been recommended for the relief of strangulated hernia, or intussusception of the bowels. Its use is not without danger, as death has resulted from the injection of less than the above quantity.

TABACI EXTRACTUM.

EXTRACT OF TOBACCO.

Evaporate any desired quantity of the fluid extract to the consistence of soft extract.

Used chiefly in ointment. Brown.

Dose.—0.01 to 0.05 gram ($\frac{1}{6}$ to 1 grain), with great care.

TABACI INFUSUM.

INFUSION OF TOBACCO.

From four grams (about 60 grains) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

The infusion is used like the enema, in corresponding doses. *It is an extremely dangerous remedy.*

It has also been employed externally to destroy parasites on man and animals, but enough may be absorbed to produce death. An infusion of tobacco of any indefinite strength (a handful of tobacco to a gallon or two of water) may be employed in the form of spray or sprinkling to destroy plant-lice, or the plants, if in pots, may be dipped into the liquid.

Tamarindus; U. S.

TAMARIND.

Tamar Indien.

Origin.—*Tamarindus indica*, Linné (*Leguminosæ*).

Habitat.—India, tropical Africa, and the West Indies.

Description.—See the Pharmacopœia, page 331. It is the pulp of the fruit. The West Indian tamarind is usually good. The Egyptian is generally poor, and often mouldy.

Constituents.—About nine per cent. citric acid, one and one-half per cent. tartaric acid, three per cent. bitartrate of potassium, besides malic acid, about twelve per cent. sugar (more in the West Indian tamarind), and some pectin, gum, etc.

Medicinal Uses.—Tamarind pulp dissolved in water makes a pleasant, acidulous, slightly laxative drink. Tamarinds are occasionally added to other cathartics.

Dose.—*Ad libitum.*

Tanacetum; U. S.

TANSY.

Tanaceti Herba—Rainfarn, Wurmkraut, G.; *Tanaisie, Herbe aux vers,* F.; *Renfana,* Sw.

Origin.—*Tanacetum vulgare,* Linné (*Compositæ*).

Habitat.—Asia, Europe, North America.

Part used.—Leaves and flowering tops. (Some pharmacopœias prescribe the use of the flowers only.)

Description.—See the Pharmacopœia, page 331.

Odor strong, camphoraceous; taste acrid, bitter.

Constituents.—From one-fourth to one-third per cent. of yellow or greenish *volatile oil;* and also a bitter principle, *tanacetin,* which has been obtained in yellowish-white warts, soluble in ether, insoluble in water, slightly soluble in alcohol.

Medicinal Uses.—Tansy is employed as an emmenagogue to restore *suppressed menstruation,* and sometimes for the purpose of procuring abortion. It is seldom, if ever, successful in producing the latter effect, but may produce intestinal irritation resulting in death. It also possesses anthelmintic properties.

Dose.—Two to five grams (15 to 75 grains), best administered in the form of fluid extract; of the oil, one to three drops.

TANACETI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF TANACETUM.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—One to five cubic centimeters (15 to 75 minims).

TANACETI INFUSUM.

INFUSION OF TANACETUM.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Thirty to sixty cubic centimeters (1 to 2 fluidounces).

Tapioca.

TAPIOCA.

Origin.—*Manihot utilissima*, Pohl (*Euphorbiaceæ*).

Habitat.—Cultivated in the tropics.

Description.—The starch obtained from the rhizome. It occurs in

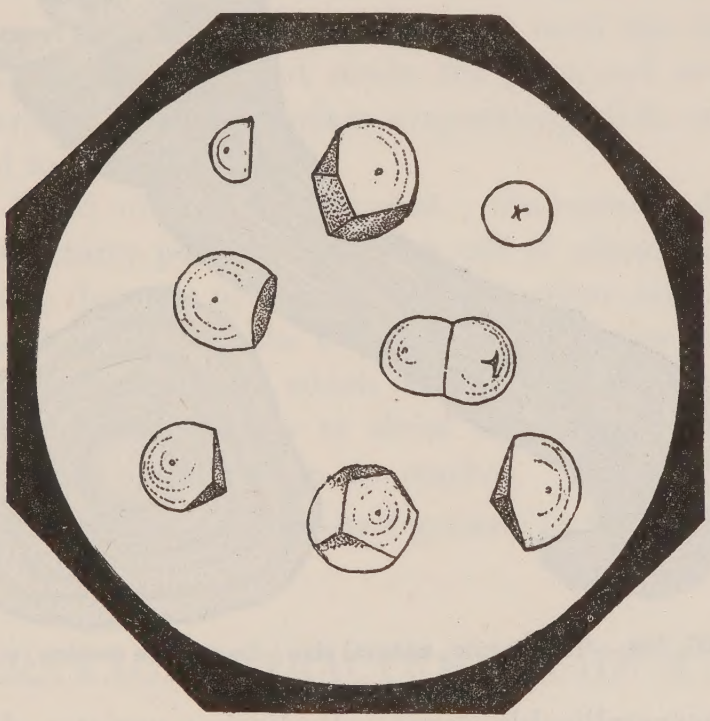


FIG. 526.—Tapioca Starch.

irregular roundish pieces and grains ; white and opaque, or somewhat translucent on the edges. Swells in hot water to a clear jelly.

Used as an article of food for invalids and others.

Taraxacum ; U. S.

TARAXACUM.

Taraxaci Radix—Löwenzahnwurzel, G.; *Pissenlit, Dent de Lion*, F.; *Taraxacon, Dente de Leon*, Sp.; *Maskrosrot*, Sw.; *Dandelion.*

Origin.—*Taraxacum Dens-leonis*, Desfontaines (*Compositæ*).

Habitat.—Europe and the United States.

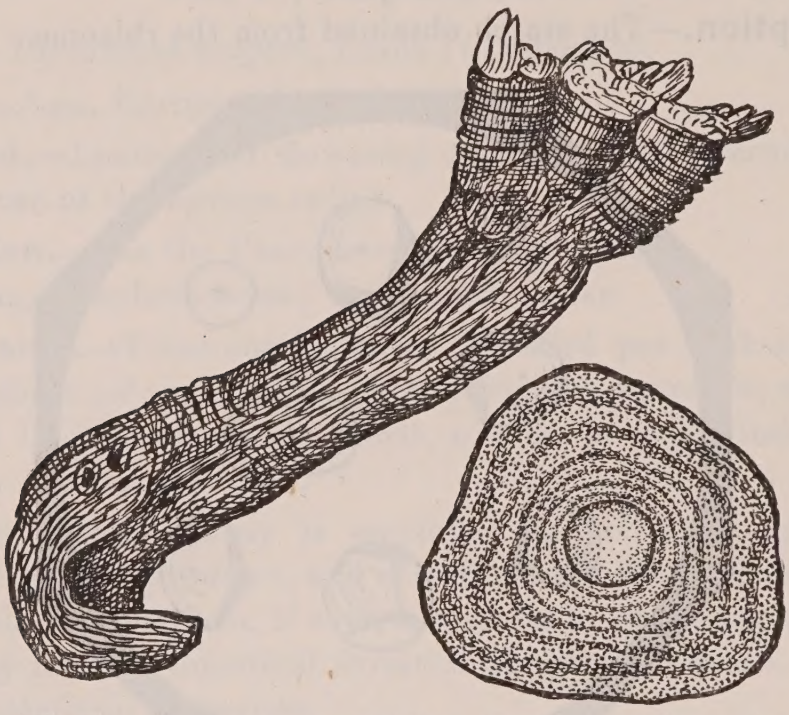
Part used.—The root, gathered in the autumn.

Description.—See the Pharmacopœia, page 331.

Taraxacum is frequently much discolored, damaged by insects, mouldy, or otherwise worthless. Must be perfectly sound and recently dried to be of any medicinal value.

Constituents.—Contains *taraxacin*, which is an intensely bitter

substance, obtained in warty crystals when pure ; *taraxacerin* is als contained in the drug, and has an acrid taste. When collected in th fall, as it should be, taraxacum contains a large quantity of *inuli* (about twenty-four per cent.), which at other seasons is replaced b



FIGS. 527, 528.—Taraxacum, natural size ; transverse section, enlarged.

levulin and uncrystallizable sugar. Inulin is a variety of starch. (See Inula.)

Taraxacin, the, perhaps, most important constituent, is soluble in water and in alcohol.

Uses.—Taraxacum is used in *chronic derangements of the digestive organs*, especially when accompanied by *hepatic congestion*. It is supposed to increase the appetite and stimulate the functions of the liver.

Dose.—Two to ten grams ($\frac{1}{2}$ to $2\frac{1}{2}$ fluidrachms), best administered as fluid extract.

TARAXACI DECOCTUM.

DECOCTION OF TARAXACUM.

From thirty grams (or about 1 avoirdupois ounce) of the drug mak five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of the British Pharmacopœia.

Dose.—Fifty to one hundred cubic centimeters ($1\frac{1}{2}$ to 3 fluidounces)

TARAXACI EXTRACTUM; U. S.

Extract of Taraxacum.

Slice five hundred grams (or 17⅔ avoirdupois ounces) fresh taraxacum (gathered in September), and bruise it in a stone mortar, sprinkling a little water over it, continuing the operation until the drug is reduced to a pulp. Then press out and strain the juice, and evaporate it in a vacuum apparatus, or in a porcelain evaporating dish, on a water-bath, until reduced to solid extract.

Brown. Yield nine to ten per cent.; the recently dried root yields from fifteen to thirty per cent. When old it often becomes granular from crystalline deposits of calcium and potassium salts.

It will be observed that the Pharmacopœia directs this extract to be made from *fresh* taraxacum, which is not the official drug, as the pharmacopœial description applies to *dried* taraxacum, which is the only kind of taraxacum obtainable in the market.

Dose.—One to two and one-half grams (15 to 40 grains).

TARAXACI EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Taraxacum.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (8⅓ fluidounces) alcohol to every three hundred grams (about 10 fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters or 17 fluidounces).

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

TARAXACI INFUSUM.

INFUSION OF TARAXACUM.

From sixty-five grams (about $2\frac{1}{3}$ avoirdupois ounces) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

Terebinthina; U. S.

TURPENTINE.

Pini Oleoresina, Thus Americanum—Common White Turpentine.

Origin.—*Pinus australis*, Michaux, and other species of *Pinus* (*Coniferæ*).

Habitat.—North Carolina and other Southeastern States of the United States.

Description.—See the Pharmacopœia, page 332.

Constituents.—From twenty to thirty per cent. volatile oil (oil of turpentine); abietic acid, and other resins, etc.

Medicinal Uses.—Not employed internally, but only as an ingredient of plasters.

Terebinthina Canadensis; U. S.

CANADA TURPENTINE.

Abietis Oleoresina—Balsam of Fir.

Origin.—*Abies balsamea*, Marshall (*Coniferæ*).

Habitat.—Canada and Northern United States.

Description.—See the Pharmacopœia, page 332.

Constituents.—From twenty-five to thirty per cent. volatile oil, the remainder being chiefly resins.

Medicinal Uses.—Rarely employed internally as a stimulant blennorrhetic. Mainly used externally or in the arts, as in mounting microscopic objects, in varnishes, etc.

Terebinthinæ Oleum; U. S.

OIL OF TURPENTINE.

Terebinthinæ Ætheroleum—Volatile Oil of Turpentine, "Spirit of Turpentine."

A volatile oil distilled from turpentine.

Description.—See the Pharmacopœia, page 244.

Medicinal Uses.—Stimulant, diuretic, anthelmintic, and purgative.

It is used internally in *low typhoid conditions* in which the tongue is dry and brown and the teeth covered with sordes; also as an anthelmintic in combination with castor-oil to insure its action on the bowels, as otherwise it might produce strangury or bloody urine.

Externally it is often employed as a rubefacient in liniments or by sprinkling on the side of a linseed poultice next to the skin. Such a poultice is often placed over the bladder in *suppressed urine.*

Dose.—As a stimulant, 0.3 to 1 cubic centimeter (5 to 15 minims); as a cathartic and anthelmintic, fifteen cubic centimeters ($\frac{1}{2}$ fluidounce) or more, combined with other cathartics.

TEREBINTHINÆ ENEMA; B.

Enema of Turpentine.

Mix thirty cubic centimeters (1 fluidounce) oil of turpentine with four hundred cubic centimeters (15 fluidounces) mucilage of starch.

Mix for one enema.

TEREBINTHINÆ LINIMENTUM ALBUM.

Stokes' Liniment.

Triturate one hundred and fifty grams (5 ounces 127 grains) yolk of egg in a large Wedgewood mortar until perfectly smooth; then add four hundred cubic centimeters (13$\frac{1}{2}$ fluidounces) oil of turpentine and twenty cubic centimeters ($\frac{2}{3}$ fluidounce) oil of lemon, and continue the trituration until a uniform mixture results; now add gradually sixty cubic centimeters (2 fluidounces) glacial acetic acid, continuing to triturate the mixture briskly. Then pour the whole into a half-gallon bottle, add three hundred and fifty-five cubic centimeters (12 fluidounces) rose-water, and shake the whole briskly and uninterruptedly until a uniform creamy emulsion results.

TEREBINTHINÆ LINIMENTUM; U. S.

Turpentine Liniment.

Melt sixty-five grams (2 ounces 130 grains) resin cerate, and then mix with it thirty-five grams (1 ounce 105 grains) oil of turpentine.

A stimulant local application in rheumatism, etc.

TEREBINTHINÆ LOTIO ASTRINGENS.

Warren's Styptic.

Put two hundred and fifty grams (8 ounces 360 grains) sulphuric acid into a two-gallon porcelain evaporating dish, kept on ice. Add one

hundred grams (3 ounces 230 grains) oil of turpentine, drop by dro stirring slowly but constantly. When effervescence ceases, add grad ally a mixture of four hundred cubic centimeters (13½ fluidounces) alc hol and three hundred and fifty-five cubic centimeters (12 fluidounce water, mix well, let stand until cold, and then transfer it to a glas stoppered bottle.

TEREBINTHINÆ OLEUM RECTIFICATUM.

RECTIFIED OIL OF TURPENTINE.

Mix one liter (34 fluidounces) oil of turpentine with six liters (1 pints) water in a copper still, and distil as long as a colorless distilla is obtained.

The product is a thin, limpid liquid, soluble in about twelve times i weight of alcohol.

The ordinary oil of turpentine ought not to be used internally, b only the rectified oil of turpentine.

TEREBINTHINÆ EMULSIO.

EMULSION OF TURPENTINE.

Mix fifteen cubic centimeters (½ fluidounce) oil of turpentine wi fifteen grams (½ ounce) of powdered gum arabic thoroughly in a morta and then add fifteen cubic centimeters (½ fluidounce) of water and trit rate rapidly until an emulsion is formed. Finally add water slow under continued agitation until the whole product measures two hu dred and forty cubic centimeters (8 fluidounces).

This emulsion is occasionally used alone or in combination with oth remedies in *typhoid fever*, etc.

Dose.—One tablespoonful every two or three hours.

Thea.

TEA.

Theæ Folia—Thee, G.; *Thé*, F.; *Té*, Sp.; *The*, Sw.

Origin.—*Camellia Thea*, Link (*Ternstrœmiaceæ*).

Habitat.—China, Japan, etc.

Part used.—The leaves.

Description.—Tea leaves are oval, obovate or oblanceolate in shap with a short petiole, prominent midrib and veins which curve upwa near the margin, blunt or pointed apex and irregularly toothed margi They vary in length from three to eight centimeters (1 to 3 inches Odor pleasant, aromatic ; taste slightly astringent, bitterish.

The teas of commerce vary considerably in color and general appearance, according to the mode of preparation and curing. The leaves are usually rolled. The color is from grayish-green, and bluish-green, to blackish.

Constituents.—From one and one-half to four per cent. of the alkaloid *theine*, which is identical with *caffeine;* from one-half to one per cent. volatile oil; some boheic acid, etc.

Medicinal Uses.—Astringent and slightly excitant. Used as an antidote in cases in which tannic acid is indicated, but not at hand. Mainly used as an article of drink, the habitual use of which is apt to produce periodical sick headaches, especially in women, which yield to no treatment except the suspension of the use of tea.

Theobroma.

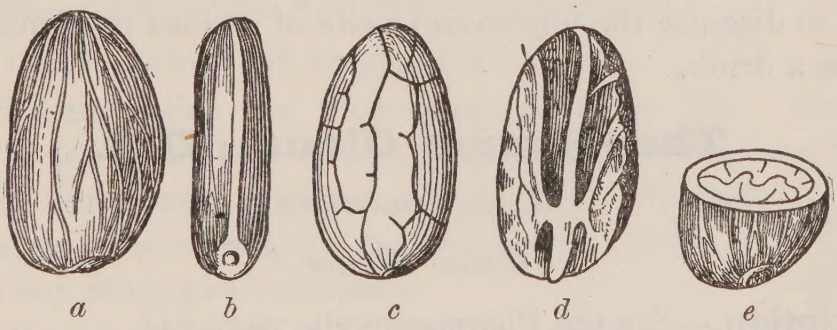
CACAO.

Origin.—*Theobroma Cacao*, Linné, and other species of *Theobroma* (*Büttneriaceæ*).

Habitat.—Tropical America.

Part used.—The seeds.

Description.—Oval, about the size of almonds; the shell is thin, fragile, reddish-brown or grayish-brown, with numerous veins; hilum



FIGS. 529–533.—Theobroma Seeds, natural size. *a*, side; *b*, edge; *e*, transverse section of seed; *c*, outer, and *d*, inner surface of cotyledon.

(or scar) at the broad end, from which a line runs along the more convex border of the seed to the narrow end, where the chalaza is found; embryo reddish-brown; cotyledons large, brittle, oily, aromatic.

Curing.—The seeds are laid in heaps on the ground, covered with leaves during the night, but exposed to the sun during the day, after which they are dried; or they are buried in the ground a few days previous to drying. By these means the bitter taste of the fresh seeds is removed.

Constituents.—The seeds consist of about twelve per cent. shells and eighty-eight per cent. kernels. They contain from one to one and

one-half per cent. of the alkaloid *theobromine* in the kernels, and somewhat less than one per cent. of it in the shells. The kernels also contain from forty-five to fifty-three per cent. fixed oil (butter of cacao), fourteen to eighteen per cent. starch, thirteen to eighteen per cent. protein compounds, a small quantity of sugar, etc.

Theobromine is an alkaloid unusually rich in nitrogen ($C_7H_8N_4O_2$), crystallizes in small white needles, soluble in boiling water and in boiling alcohol; inodorous, and of a bitter taste. It closely resembles caffeine, and can be converted into it.

Uses.—The seeds of theobroma are used for preparing chocolate, for which purpose they are roasted, and ground by trituration in heated vessels until reduced to a smooth paste, which is then moulded into cakes and allowed to cool, when the chocolate hardens.

Chocolate is nutritive and stimulant.

THEOBROMÆ PASTA.

CHOCOLATE.

Prepared from the seeds of *Theobroma Cacao* by roasting, removing the shells, and then crushing and grinding them by the aid of heat until reduced to a smooth paste, which is cast in moulds.

Chocolate is either plain, or sweetened, or aromatized with vanilla, cinnamon, etc.

Used to disguise the unpleasant taste of various medicines.

Also as a drink.

Theobromæ Oleum; U. S.

OIL OF THEOBROMA.

Cacao Butter.

Description.—See the Pharmacopœia, page 244.

The fixed oil expressed from the seeds of *Theobroma Cacao.* Melts at summer heat.

Used for making suppositories.

THEOBROMÆ CERATUM.

RED LIP SALVE.

Melt together thirty-five grams (1 ounce 100 grains) white wax, thirty-five grams oil of theobroma, and thirty grams (1 ounce 25 grains) oil of almond. When nearly cold add a drop of oil of rose, and color the whole with a minute quantity of carmine previously triturated with a drop of water of ammonia.

Theriaca.

THERIAC.

Macerate one gram (15 grains) opium with four cubic centimeters (1 fluidrachm) sherry wine for twenty-four hours. Then mix it with seventy-five grams (2 ounces 280 grains) honey, and afterward incorporate the mixture thoroughly with the following powders previously mixed together, viz. : six grams (90 grains) angelica root, four grams (60 grains) serpentaria, two grams (30 grains) valerian, two grams squill, two grams zedoary, two grams cinnamon, one gram (15 grains) cardamom, one gram myrrh, and one gram pure precipitated sulphate of iron.

Formerly used as an external anodyne application in painful abdominal diseases.

Thuja ; U. S.

THUJA.

Thujæ Ramuli—Arbor Vitæ.

Origin.—*Thuja occidentalis*, Linné (*Coniferæ*).

Habitat.—Canada and Northern United States.

Parts used.—The fresh twigs from the tops.

Description.—See the Pharmacopœia, page 332. See also the figure. The leaves are about three millimeters ($\frac{1}{8}$ inch) long, with blunt points, and have each a raised oil gland on the back. Odor balsamic ; taste pungent, camphoraceous, bitter.

FIG. 534.—Thuja Occidentalis, enlarged.

Not in any other pharmacopœia.

Constituents.—The principal constituent is a volatile oil. It also contains a bitter amorphous substance called *pinipicrin*, which also exists in the leaves of *Pinus sylvestris*, and a yellow substance called *thujin*, soluble in water and in alcohol.

Medicinal Uses.—It has been given internally in intermittent fever, rheumatism, and amenorrhœa, and as an alterative blennorrhetic in chronic catarrh and bronchorrhœa. Externally the fresh leaves rubbed up with lard have been used as a stimulant application to indolent ulcers and to ocndylomata.

Dose.—Two to five grams (30 to 75 grains), three or four times a day.

THUJÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF ARBOR VITÆ.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Dose.—Two to five cubic centimeters (30 to 75 minims).

THUJÆ TINCTURA.

TINCTURE OF THUJA.

Macerate sixty grams (2 ounces) fresh thuja, in No. 30 powder, with three hundred cubic centimeters (10 fluidounces) alcohol for five days. Express and filter.

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Thymol; U. S.

THYMOL.

Description and Tests.—See the Pharmacopœia, page 332.

New to the Pharmacopœia.

Used externally in solution or ointment as a powerful antiseptic.

Thymus.

THYME.

Thymi Folia—Thymian, Römischer Quändel, G.; *Thym*, F.; *Timjan*, Sw.; *Garden Thyme.*

Origin.—*Thymus vulgaris*, Linné (*Labiatæ*).

Habitat.—Cultivated.

Part used.—The leaves.

Description.—Linear or narrow, oblong, about five millimeters (⅕ inch) long. They are grayish-green, grayish-hairy on the under side, dotted with numerous oil glands on both sides. Odor strong, aromatic; taste pungent, spicy.

Constituents.—About two and one-half per cent. volatile oil, which is yellowish-brown, and consists of cymene, thymene, and *thymol.*

Properties.—Stimulant, tonic, carminative, antispasmodic, emmenagogue. Scarcely ever used internally.

Dose.—Two to five grams (30 to 75 grains), in infusion or fluid extract.

Thymi Oleum ; U. S.

OIL OF THYME.

Thymi Ætheroleum — Volatile Oil of Thyme.

The volatile oil distilled from *Thymus vulgaris.*

Description.—See the Pharmacopœia, page 244.

Uses.—As it contains thymol it might be employed as an antiseptic.

Tiglii Oleum ; U. S.

CROTON OIL.

Crotonis Oleum.

Origin.—*Croton Tiglium*, Linné (*Euphorbiaceæ*).

Description.—See the Pharmacopœia, page 244.

Color, solubility in alcohol, and acridity increase by age.

Medicinal Uses.—Internally a most powerful drastic cathartic, occasionally used in apoplexy or lead-poisoning.

Externally it is irritant and suppurant, and is used to produce powerful counter-irritation.

Dose.—One-fourth to two drops.

TIGLII COLLODIUM.

CROTON-OIL COLLODION.

Mix equal parts of croton oil and flexible collodion.

Used as a suppurant.

Tilia.

TILIA.

Tiliæ Flores—Lindenblüthen, G.; *Lindblommor*, Sw.; *Linden Flowers.*

Origin.—*Tilia vulgaris*, Hayn ; and *Tilia parviflora* and *Tilia grandiflora*, Erhardt.

Habitat.—Europe.

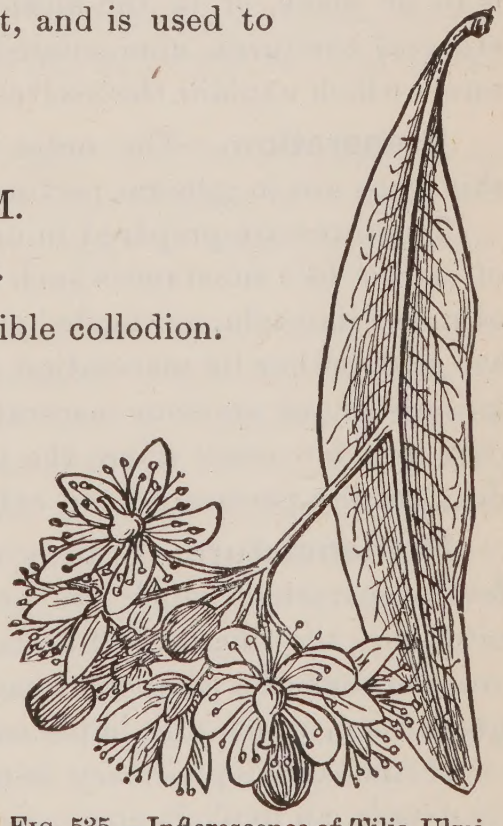


FIG. 535.—Inflorescence of Tilia Ulmifolia, natural size.

Parts used.—The whole inflorescence, with the leaves or bracts properly belonging to it.

Description.—See the figure.

The flowers are yellowish-white and the bracts light green. In the

dried state they should have their natural colors, except that the petals always become somewhat more yellowish. Must not be brown. Odor pleasant but feeble ; taste sweetish.

Contains minute quantities of volatile oil and aromatic resin.

Medicinal Uses.—Linden flowers are much used in the form of hot infusion, or tea, as a diaphoretic, and to relieve *indigestion, nervousness*, etc.

Dose.—Two to five grams (30 to 75 grains), in infusion.

Tincturæ.

TINCTURES.

Tinkturen, G.; *Teintures*, F.; *Tinturas*, Sp.; *Tinkturer*, Sw.

Tinctures, in a proper sense, are liquid preparations made from crude drugs with more or less alcoholic menstrua, and proportionately weaker than the fluid extracts. Water, ether, glycerin, ammonia, volatile oils, etc., are sometimes added, either to the alcohol with which the tincture is to be made, or to the finished tincture. Hydro-alcoholic tinctures, ethereal tinctures, ammoniated tinctures, alcoholic tinctures, etc., are terms which explain themselves.

Preparation.—The notes under the title "Extracta Fluida" in this work are in general pertinent also to the subject of tinctures.

Tinctures are prepared in one of three ways, principally : Tinctures of extract-like substances such as aloes, or gum resins like asafœtida, or of resins like tolu, are made by maceration ; those of crude plant organs are made either by maceration and subsequent percolation, or by percolation without previous maceration. The last-named method is adopted only in a few cases where the menstruum is strongly alcoholic, and the drug readily permeated and exhausted by it.

Nomenclature.—Among the tinctures of the Pharmacopœia are a few preparations which are not tinctures in the proper sense of that term, viz., the tinctures of acetate of iron and of chloride of iron, which are solutions of a compound nature, and the tinctures of iodine and of green soap, which are simple solutions.

If the art of pharmacy is to progress toward greater perfection in its details, an explicit nomenclature is one of the necessary aids to its systematic development. Without a systematic terminology, botany would be an impossibility ; the same is true of all other sciences and of the arts. Those who have no ambition beyond buying and selling medicines, and making a living by it, will naturally enough object to any nice distinctions in nomenclature as well as in the quality, purity,

and strength of the drugs they handle. To them every step forward which requires the least exertion is most unwelcome, and the plausible argument honestly advanced by some good pharmacists, that there is danger in making any changes in nomenclature, is eagerly repeated.

Strength.—The relation which the quantity of finished tincture bears to the quantity of drug it represents, or its proportional strength, is far from uniform in the several pharmacopœias, and without considering the compound tinctures, and the preparations classed as tinctures without being such, we find that our pharmacopœial tinctures are of five, ten, fifteen, twenty, forty or fifty per cent. strength. Moreover, the strengths of some tinctures have been fixed without any apparent reference to their uses and posological potencies. The strengths of the tinctures of the Pharmacopœia are in fact simply arbitrary mathematical proportions. In this respect the pharmacopœias of other countries are no better than ours. It is remarkable that we should have a tincture of conium of only fifteen per cent. strength, although the drug and the menstruum are therapeutically antagonistic. The tincture of matico is only ten per cent.; the tincture of veratrum viride is made of fifty per cent. strength, although the dose is then only five to ten drops; and the tincture of aconite root is a forty per cent. tincture, with a dose of from one to six drops.

In the opinion of the authors, the strength of all liquid preparations ought to be fixed with reference to their properties and uses, and their relative potency, and with only secondary regard to simple mathematical ratios.

Finally, we believe that many of the official tinctures are useless preparations, and that they should be discarded in practice in favor of the fluid extracts. Among the tinctures which we consider superfluous are those of: Aconite, arnica flowers, arnica root, bitter orange peel, belladonna, bryonia, calendula, calumba, Indian cannabis, cardamom, compound cardamom, chirata, cimicifuga, cinchona, compound cinchona, cinnamon, colchicum, conium, cubeb, digitalis, gelsemium, compound gentian, ginger, hops, hydrastis, hyoscyamus, ignatia, krameria, lobelia, matico, nux vomica, physostigma, pyrethrum, quassia, rhubarb, saffron, sanguinaria, squill, serpentaria, stramonium, sumbul, valerian, and veratrum viride, all of which are less eligible than the respective fluid extracts.

If the physician prefers to prescribe calumba with more alcohol than the fluid extract contains, then he will probably add more alcohol than even the tincture contains. Then, if brandy or whiskey has to be combined with the tincture, why not with the fluid extract?

The fluid extracts are not open to the objection that their strength

is fixed arbitrarily and without system. While their relative posological potency varies extremely (from one drop to over one hundred times that quantity), it is not to be forgotten that the relative differences in activity between the drugs themselves are exactly preserved in the fluid extracts, while in the tinctures they are confused without any apparent definite end in view.

Preservation.—All tinctures as well as fluid extracts should be kept in a moderately warm room where the temperature does not change greatly or suddenly, and they should, moreover, be properly protected from the chemical rays of light or from direct sunlight.

Some tinctures become unclear when exposed to cold, as in shipping in winter, but become clear again when placed in a warm room, while others, when once unclear, cannot be made clear again except by filtration.

Tinctures from Fluid Extracts.—It is our deliberate judgment, upon careful consideration of the actual condition of the practice of pharmacy, the practical ends in view, and the essential facts involved, that when dilute liquid alcoholic preparations of vegetable drugs are required they are best prepared by simply diluting the fluid extracts to the desired point by adding a sufficient quantity of the proper menstruum.

A properly prepared fluid extract well represents the drug from which it is made. It is concentrated and thus in compact form, and far less liable to change or deterioration than the drug in its crude condition. If, therefore, a well-made fluid extract is at hand it is likely to be of much better quality than the average drug as obtainable from dealers in general; and when a preparation less concentrated than the fluid extract is wanted, common sense and good pharmacy would seem to indicate that the dilution of the fluid extract is an eminently practical method to adopt.

Many intelligent and conscientious druggists do make their tinctures from fluid extracts. Physicians in places remote from drug stores are by necessity compelled to dispense their own remedies; they are not pharmacists and do not carry a large assortment of drugs and preparations in stock; and, as their time is limited, they also have naturally adopted this ready and sensible method of preparing tinctures. It reduces labor, economizes materials, limits the amount of capital required to keep a varied assortment of medicines by reducing the quantity of fixtures, stock bottles, shelving, etc.; and in great measure does away with the necessity of keeping a large number of crude drugs in stock, which too frequently become worthless before they are used up.

A good fluid extract is always far more useful than the crude drug itself, be the latter good or bad. In fact, a careful pharmacist should rather convert all his stock of crude drugs into fluid extracts at once

than to keep them on hand for the purpose of making tinctures, or fluid extracts, etc., as required from time to time, as his fluid extracts would still be good long after the drugs have become deteriorated or inert through the influence of time, air, light, heat, moisture, insects, etc.

In obedience to the demands of both physicians and pharmacists, therefore, the manufacturers of pharmaceutical preparations have published formulæ for making tinctures, wines, etc., from fluid extracts, the Pharmacopœia failing to give them. It is a well-known fact that these formulæ are more frequently consulted when tinctures, etc., are to be prepared than the Pharmacopœia itself. The reason for this anomalous state of affairs is obvious—it is that the plan of making tinctures from fluid extracts is easier, more practical, and yields generally better results than do the methods of the Pharmacopœia.

The formulæ furnished by the manufacturers of fluid extracts are, however, as a rule, more or less incorrect, and often grossly at variance with recognized authoritative standards. Any one who will take the trouble to compare a few of these sets of formulæ with the new Pharmacopœia, with the old pharmacopœia, with the several dispensatories, and with each other, will soon find that the formulæ given in the price-lists, formularies, labels, etc., extant in the trade, are so seriously wrong that if followed they must inevitably do great mischief. Thus we find that the published formulæ for such powerful tinctures as those of aconite root, veratrum viride, cannabis indica, gelsemium, conium fruit, etc., vary in strength from fifty to two hundred per cent. ! ! In less important tinctures we have found variations of twenty, fifty, one hundred, and even four hundred per cent. Sometimes the formula is one that will yield a tincture of only one-fifth its proper strength ; sometimes it is one that will yield a tincture of more than double its proper strength. By "proper strength" we mean in this connection, of course, the pharmacopœial strength ; but these blunders are not accounted for by the changes of strength introduced in the new Pharmacopœia, for in very many instances the formulæ, as we have stated above, do not agree with any recognized standards, old or new, nor with common usage.

All formulæ, therefore, which are given outside of the Pharmacopœia ought to be verified before being used.

In verifying the formulæ for making preparations for which the Pharmacopœia gives standards, it is necessary to bear in mind that the formulæ of the U. S. Pharmacopœia are BY WEIGHT ONLY. It will be found convenient to refer to the table of specific volumes of alcoholic liquids on page 1138, from which it will be seen that 100 avoirdupois ounces of alcohol, at the most common temperatures, measures 118 fluid-ounces, and 100 avoirdupois ounces of diluted alcohol measures 104

fluidounces; while 100 avoirdupois ounces of water measures only 96 fluidounces.

It will unquestionably be granted, however, that when the product is identical with, and properly fulfils the intentions of the pharmacopœial preparation, it is quite immaterial by what method it was made. Thus, a fluid extract made by re-percolation truly answers the requirements of the Pharmacopœia, although re-percolation, notwithstanding it is the best process known, is authorized only as an alternate process; chemicals produced by manufacturers are rarely made by the pharmacopœial methods, but they are undoubtedly strictly in accordance with the pharmacopœial requirements if they answer the official descriptions and tests; the blue mass and blue ointment which are used all over the country are rarely, if ever, made as described in the Pharmacopœia. A tincture prepared by diluting the fluid extract is certainly medicinally identical with a tincture made by percolation or maceration, if the materials were the same in both cases and the process properly conducted. More than that, we are bound to recognize the fact that the actual practice is so general, and so rational, that it certainly will prevail unless there are material reasons for discouraging it. We accordingly believe that the Pharmacopœia itself should give formulæ for preparing tinctures, or any other dilutions required, directly from the fluid extracts, especially as most of the tinctures are only superfluous preparations when we have the fluid extracts.

The Pharmacopœia directs the use of fluid extracts in preparing tincture of ipecac and opium, wine of ipecac, and the syrups of ipecac, krameria, lactucarium, rose, rubus, senega, and ginger. This list can profitably be largely extended.

The objections which we have heard urged against the preparations of tinctures from fluid extracts are trifling in comparison with the practical advantages gained.

We give below a table of carefully prepared formulæ for making all tinctures used to any considerable extent, which can properly be so made.

Formulæ for Tinctures which may Properly be Made from the Respective Fluid Extracts.

Absinthium.—Mix 30 C.c. (or 1 fl.oz.) of the fluid extract with 120 C.c. (or 4 fl.ozs.) diluted alcohol.—Dose: 2 to 15 C.c. (½ to 4 fl.drs.).

Absinthium, Comp.; Sw.—Mix 4 C.c. (⅛ fl.oz.) of each of the fluid extracts of Carduus Benedictus, Orange Berries, and Galanga; 15 C.c. (½ fl.oz.) fluid extract of Absinthium; and 180 C.c. (6 fl.ozs.) diluted alcohol.—Dose: 1 to 4 C.c. (15 to 60 minims).

Aconite Leaves.—Mix 30 C.c. (or 1 fl.oz.) fluid extract of Aconite Leaves and 210 C.c. (7 fl.ozs.) diluted alcohol.—DOSE : 0.5 to 1 C.c. (8 to 15 minims).

Aconite [Root]; U. S.—Mix 200 C.c. (6¾ fl.ozs.) fluid extract of Aconite Root and 420 C.c. (14 fl.ozs.) alcohol.—DOSE : 0.1 to 0.25 C.c. (1 to 4 minims).

Actæa Racemosa (see Cimicifuga).

Aloes; U. S.—Mix 60 C.c. (2 fl.ozs.) liquid extract of Aloes ; 30 C.c. (1 fl.oz.) fluid extract of Glycyrrhiza ; and 210 C.c. (7 fl.ozs.) diluted alcohol.—DOSE : As a laxative, 1 to 3 C.c. (15 to 45 minims); as a purgative, 5 C.c. (75 minims).

American Hellebore (see Veratrum Viride).

Angelica Root.—Mix 30 C.c. (1 fl.oz.) fluid extract of Angelica Root and 120 C.c. (4 fl.ozs.) diluted alcohol.—DOSE : 5 to 15 C.c. (1 to 4 fl.drs.).

Angustura.—Mix 30 C.c. (1 fl.oz.) fluid extract of Angustura and 120 C.c. (4 fl.ozs.) diluted alcohol.—DOSE : 4 to 12 C.c. (1 to 3 fl.drs.).

Aralia Spinosa; Amer. Disp.—Mix 30 C.c. (1 fl. oz.) fluid extract of Aralia Spinosa and 130 C.c. (4⅓ fl.ozs.) diluted alcohol.—DOSE : 5 to 15 C.c. (1 to 4 fl.drs.).

Arnica Flowers; U. S.—Mix 150 C.c. (5 fl.ozs.) fluid extract of Arnica Flowers and 660 C.c. (22 fl.ozs.) diluted alcohol.—DOSE : 1 to 3 C.c. (15 to 45 minims).

Arnica Root; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Arnica Root and 285 C.c. (9½ fl.ozs.) diluted alcohol.—DOSE : 2 to 6 C.c. (½ to 1½ fl.dr.).

Aspidosperma.—Mix 30 C.c. (1 fl.oz.) fluid extract of Quebracho and 120 C.c. (4 fl.ozs.) alcohol.—DOSE : 5 to 15 C.c. (1 to 4 fl.drs.).

Baptisia.—Mix 30 C.c. (1 fl.oz.) fluid extract of Baptisia and 120 C.c. (4 fl.ozs.) alcohol.—DOSE : 1 to 5 C.c. (15 to 75 minims).

Belladonna [Leaves]; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Belladonna Leaves and 180 C.c. (6 fl.ozs.) diluted alcohol.—DOSE : 1 to 2 C.c. (15 to 30 minims).

Belladonna Root.—Mix 45 C.c. (1½ fl.oz.) fluid extract of Belladonna Root and 255 C.c. (8½ fl.ozs.) alcohol.—DOSE : 0.5 to 2 C.c. (10 to 30 minims).

Black Cohosh (see Cimicifuga).

Black Snake Root (see Cimicifuga).

Blood Root (see Sanguinaria).

Blood Root, Comp. (see Sanguinaria, Comp.).

Blue Cohosh (see Caulophyllum).

Blue Flag (see Iris Versicolor).

Boldo.—Mix 30 C.c. (1 fl.oz.) fluid extract of Boldo and 120 C.c. (4 fl.ozs.) alcohol.—Dose : 0.3 to 2.5 C.c. (5 to 40 minims).

Bryonia ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Bryonia and 345 C.c. (11½ fl.ozs.) alcohol.—Dose : 5 to 25 C.c. (1 to 6 fl.drs.).

Buchu.—Mix 30 C.c. (1 fl.oz.) fluid extract of Buchu and 150 C.c. (5 fl.ozs.) alcohol.—Dose : 5 to 10 C.c. (1 to 2½ fl.drs.).

Cactus Grandiflora.—The so-called fluid extract is itself a tincture ; it is sometimes diluted, however, with three times its own volume of alcohol. The dose of the concentrated tincture (which is sold under the title Fluid Extract) is from 2 to 5 minims, and that of the diluted tincture is, therefore, 8 to 20 minims.

Calabar Bean (see Physostigma).

Calamus.—Mix 30 C.c. (1 fl.oz.) fluid extract of Calamus and 270 C.c. (9 fl.ozs.) alcohol.—Dose : 5 to 15 C.c. (1 to 4 fl.drs.).

Calendula Flowers.—Mix 30 C.c. (1 fl.oz.) fluid extract of Calendula Flowers and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose : 5 to 15 C.c. (1 to 4 fl.drs.).

Calendula Herb ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Calendula Herb and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose : 5 to 15 C.c. (1 to 4 fl.drs.).

Calumba ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Calumba ; 195 C.c. (6½ fl.ozs.) alcohol ; and 120 C.c. (4 fl.ozs.) water.—Dose : 5 to 10 C.c. (1 to 2½ fl.drs.).

Canella.—Mix 30 C.c. (1 fl.oz.) fluid extract of Canella and 270 C.c. (9 fl.ozs.) alcohol.—Dose : 5 to 15 C.c. (1 to 4 fl.drs.).

Cannabis Indica (see Indian Cannabis).

Cantharides ; U. S.—Mix 15 C.c. (½ fl.oz.) fluid extract of Cantharides and 360 C.c. (12 fl.ozs.) alcohol.—Dose : 0.5 to 1 C.c. (8 to 15 minims).

Capsicum ; U. S.—Mix 15 C.c. (½ fl.oz.) fluid extract of Capsicum and 360 C.c. (12 fl.ozs.) alcohol.—Dose : 1 to 8 C.c. (15 to 120 minims).

Cardamom ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Cardamom and 210 C.c. (7 fl.ozs.) diluted alcohol.—Dose : 2 to 10 C.c. (½ to 2½ fl.drs.).

Cardamom, Comp. ; U. S.—Mix 30 C.c. (1 fl.oz.) compound fluid extract of Cardamom (made twenty times the strength of the tincture) ; 30 C.c. (1 fl.oz.) glycerin ; and 540 C.c. (18 fl.ozs.) diluted alcohol.—Dose : 2 to 10 C.c. (½ to 2½ fl.drs.).

Cascarilla.—Mix 15 C.c. (½ fl.oz.) fluid extract of Cascarilla, and 285 C.c. (9½ fl.ozs.) alcohol.—Dose : 2 to 10 C.c. (½ to 2½ fl.drs.).

Catechu, Comp. ; U. S. (also called simply tincture of Catechu, as

in Phar. 1870).—Mix 30 C.c. (1 fl.oz.) compound fluid extract of Catechu (made five times the strength of the official tincture) and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose: 2 to 8 C.c. (½ to 2 fl.drs.).

Caulophyllum.—Mix 30 C.c. (1 fl.oz.) fluid extract of Caulophyllum; 180 C.c. (6 fl.ozs.) alcohol; and 90 C.c. (3 fl.ozs.) water.—Dose: 5 to 15 C.c. (1 to 4 fl.drs.).

Caulophyllum, Comp.; Amer. Disp.—Mix 30 C.c. (1 fl.oz.) fluid extract of Caulophyllum; 15 C.c. (½ fl.oz.) fluid extract of Ergot; 15 C.c. (½ fl.oz.) fluid extract of Polygonum; 8 C.c. (¼ fl.oz.) oil of Savin; and 300 C.c. (10 fl.ozs.) alcohol.—Dose: 1 to 4 C.c. (15 to 60 minims).

Chamælirium (see Helonias).

Chirata; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Chirata and 285 C.c. (9½ fl.ozs.) diluted alcohol.—Dose: 5 to 10 C.c. (1 to 2½ fl.drs.).

Cimicifuga; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Cimicifuga and 150 C.c. (5 fl.ozs.) alcohol.—Dose: 2 to 5 C.c. (30 to 75 minims).

Cimicifuga, Comp.; Amer. Disp.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Cimicifuga; 24 C.c. (¾ fl.oz.) fluid extract of Sanguinaria; 12 C.c. (⅜ fl.oz.) fluid extract of Phytolacca Root; and 330 C.c. (11 fl.ozs.) alcohol.—Dose: 1 to 4 C.c. (15 to 60 minims).

Cinchona; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Cinchona;* 210 C.c. (7 fl.ozs.) alcohol; 45 C.c. (1½ fl.oz.) water; and 15 C.c. (½ fl.oz.) glycerin.—Dose: 2 to 8 C.c. (½ to 2 fl.drs.).

Cinchona, Comp.; U. S.—Mix 30 C.c. (1 fl.oz.) compound fluid extract of Cinchona;† 105 C.c. (3½ fl.ozs.) alcohol; and 15 C.c. (½ fl.oz.) glycerin.—Dose: 2 to 8 C.c. (½ to 2 fl.drs.).

Cinnamon; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Cinnamon; 315 C.c. (10½ fl.ozs.) alcohol.—Dose: 4 to 8 C.c. (1 to 2 fl.drs.). The official menstruum is too weak.

Cinnamon, Comp.; Amer. Disp.—Mix 8 C.c. (¼ fl.oz.) fluid extract of Cinnamon; 3 C.c. (45 minims) fluid extract of Ginger; 3 C.c. fluid extract of Xanthoxylum Fruit; 3 C.c. fluid extract

* It is to be remembered that these proportions refer only to the full strength fluid extract, and that a half-strength or any other preparation of cinchona except the fluid extract of the new Pharmacopœia (1880) will not answer. Several kinds are sold on the market.

† There are several different strengths of "Compound Fluid Extract of Cinchona" on the market; the formula here given refers to a fluid extract of full standard strength of five times the strength of the official tincture.

of Cardamom ; and 105 C.c. (3½ fl.ozs.) alcohol.—Dose : 5 to 10 C.c. (1 to 2½ fl.drs.).

Coca (see Erythroxylon).

Cocculus Indicus.—Mix 30 C.c. (1 fl.oz.) fluid extract of Cocculus Indicus and 270 C.c. (9 fl.ozs.) alcohol.—Dose : 0.1 to 1.5 C.c. (2 to 20 minims).

Cohosh, Black (see Cimicifuga).

Cohosh, Black, Comp. (see Cimicifuga, Comp.).

Cohosh, Blue (see Caulophyllum).

Cohosh, Blue, Comp. (see Caulophyllum, Comp.).

Colchicum Root.—Mix 90 C.c. (3 fl.ozs.) fluid extract of Colchicum Root and 210 C.c. (7 fl.ozs.) diluted alcohol.—Dose : 0.3 to 1.3 C.c. (5 to 20 minims).

Colchicum Seed ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Colchicum Seed, 120 C.c. (4 fl.ozs.) alcohol and 60 C.c. (2 fl.ozs.) water.—Dose : 0.5 to 2 C.c. (10 to 30 minims).

Colchicum Seed, Comp.; Amer. Disp.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Colchicum Seed ; 90 C.c. (3 fl.ozs.) fluid extract of Cimicifuga; and 810 C.c. (27 fl.ozs.) diluted alcohol.—Dose : 1 to 4 C.c. (15 to 60 minims).

Colocynth.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Colocynth and 240 C.c. (8 fl.ozs.) diluted alcohol.—Dose : As a stomachic, 0.2 to 0.5 C.c. (3 to 8 minims).

Columbo (see Calumba).

Conium Leaves.—Mix 30 C.c. (1 fl.oz.) fluid extract of Conium Leaves and 210 C.c. (7 fl.ozs.) diluted alcohol.—Dose : 2 to 4 C.c. (½ to 1 fl.dr.).

Conium Fruit ("Seed") ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Conium Fruit and 180 C.c. (6 fl.ozs.) diluted alcohol.—Dose : 1 to 4 C.c. (15 to 60 minims), increasing if necessary.

Corydalis ; Amer. Disp.—Mix 90 C.c. (3 fl.ozs.) fluid extract of Corydalis and 390 C.c. (13 fl.ozs.) diluted alcohol.—Dose : 1 to 8 C.c. (15 to 120 minims).

Coto.—Mix 30 C.c. (1 fl.oz.) fluid extract of Coto Bark and 120 C.c. (4 fl.ozs.) alcohol.—Dose : 0.5 to 5 C.c. (10 to 75 minims).

Cubeb ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Cubeb and 300 C.c. (10 fl.ozs.) alcohol.—The menstruum prescribed in the Pharmacopœia (diluted alcohol) is too weak.—Dose : 2 to 8 C.c. (½ to 2 fl.drs.).

Culver's Root (see Leptandra).

Delphinium.—Mix 30 C.c. (1 fl.oz.) fluid extract of Delphinium

Seed with 270 C.c. (9 fl.ozs.) alcohol.—Dose: 0.50 to 2 C.c. (8 to 30 minims).

Digitalis; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Digitalis and 180 C.c. (6 fl.ozs.) diluted alcohol.—Dose: 0.3 to 4 C.c. (5 to 60 minims).

Dracontium; Amer. Disp.—Mix 90 C.c. (3 fl. ozs.) fluid extract of Dracontium and 390 C.c. (13 fl.ozs.) diluted alcohol.—Dose: 4 to 15 C.c. (1 to 4 fl.drs.).

Ergot.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Ergot with a mixture of 90 C.c. (3 fl.ozs.) alcohol and 90 C.c. water.—Dose: 2 to 15 C.c. ($\frac{1}{2}$ to 4 fl.drs.).

Eucalyptus.—Mix 30 C.c. (1 fl.oz.) fluid extract of Eucalyptus and 210 C.c. (7 fl.ozs.) alcohol.—Dose: 4 to 10 C.c. (1 to $2\frac{1}{2}$ fl.drs.).

Fish Berries (see Cocculus Indicus).

Foxglove (see Digitalis).

Galls (see Nutgall).

Gelsemium; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Gelsemium and 445 C.c. ($14\frac{3}{4}$ fl.ozs.) alcohol.—Dose: 0.5 to 4 C.c. (10 to 60 minims).

Gentian, Comp.; U. S.—Mix 30 C.c. (1 fl.oz.) compound fluid extract of Gentian, made seven times the volumetric strength of the official tincture, and 180 C.c. (6 fl.ozs.) diluted alcohol.—Dose: 2 to 10 C.c. ($\frac{1}{2}$ to $2\frac{1}{2}$ fl.drs.).

Ginger; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Ginger and 300 C.c. (10 fl.ozs.) alcohol.—Dose: 1 to 5 C.c. (15 to 75 minims).

Golden Seal (see Hydrastis).

Hellebore, American (see Veratrum Viride).

Henbane Leaves (see Hyoscyamus).

Henbane Seed (see Hyoscyamus Seed).

Hops; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Hops and 120 C.c. (4 fl.ozs.) diluted alcohol.—This menstruum is in our opinion too weak; alcohol would be better.—Dose: 5 to 10 C.c. (1 to $2\frac{1}{2}$ fl.drs.).

Hydrastis; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Hydrastis and 255 C.c. ($8\frac{1}{2}$ fl.ozs.) alcohol.—Dose: 2 to 8 C.c. ($\frac{1}{2}$ to 2 fl.drs.). The official menstruum is too weak.

Hydrastis, Comp.; Amer. Disp.—Mix 30 C.c. (1 fl.oz.) fluid extract of Hydrastis; 30 C.c. fluid extract of Lobelia Seed; and 180 C.c. (6 fl.ozs.) diluted alcohol.—Used externally.

Hyoscyamus [Leaves]; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Hyoscyamus Leaves and 180 C.c. (6 fl.ozs.) diluted alcohol.—Dose: 1 to 8 C.c. (15 to 120 minims).

Hyoscyamus Seed.—Mix 45 C.c. (1½ fl.oz.) fluid extract of Hyoscyamus Seed and 255 C.c. (8½ fl.ozs.) alcohol.—DOSE: 1 to 3 C.c. (15 to 45 minims).

Ignatia; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Ignatia and 330 C.c. (11 fl.ozs.) alcohol.—DOSE: 1 to 4 C.c. (15 to 60 minims).

Indian Cannabis; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Indian Cannabis and 300 C.c. (10 fl.ozs.) alcohol.—DOSE: 0.5 to 2 C.c. (8 to 30 minims).

"Indian Hemp, true" (see Indian Cannabis).

Ipecac.—Mix 30 C.c. (1 fl.oz.) fluid extract of Ipecac and 270 C.c. (9 fl.ozs.) diluted alcohol.—DOSE: 8 to 12 C.c. (2 to 3 fl.drs.) as an emetic; 1 to 2 C.c. (½ to 1 fl.dr.) as an expectorant.

Iris Versicolor; Amer. Disp.—Mix 45 C.c. (1½ fl.oz.) fluid extract of Iris Versicolor and 195 C.c. (6½ fl.ozs.) alcohol.—DOSE: 0.5 to 1 C.c. (8 to 15 minims).

Jaborandi (see Pilocarpus).

Jalap.—Mix 30 C.c. (1 fl.oz.) fluid extract of Jalap and 120 C.c. (4 fl.ozs.) alcohol.—DOSE: 5 to 10 C.c. (1 to 2½ fl.drs.).

Kalmia; Amer. Disp.—Mix 90 C.c. (3 fl.ozs.) fluid extract of Kalmia and 390 C.c. (13 fl.ozs.) diluted alcohol.—DOSE: 0.5 to 2 C.c. (8 to 30 minims).

Kino; U. S.—Mix 30 C.c. (1 fl.oz.) liquid extract of Kino (made so that each cubic centimeter represents one-half gram of kino) with 15 C.c. (½ fl.oz.) glycerin; 15 C.c. water; and 90 C.c. (3 fl.ozs.) alcohol.—DOSE: 2 to 8 C.c. (½ to 2 fl.drs.).

Krameria; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Krameria and 255 C.c. (8½ fl.ozs.) diluted alcohol.—DOSE: 2 to 10 C.c. (½ to 2½ fl.drs.).

Leptandra.—Mix 30 C.c. (1 fl.oz.) fluid extract of Leptandra and 270 C.c. (9 fl.ozs.) diluted alcohol.—DOSE: 2 to 15 C.c. (½ to 4 fl.drs.).

Lobelia; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Lobelia [Herb] with 255 C.c. (8½ fl.ozs.) diluted alcohol.—DOSE: 0.5 to 3 C.c. (10 to 45 minims); as an emetic, up to 10 C.c. (2½ fl.drs.).

Lobelia, Comp.; Amer. Disp.—Mix 15 C.c. (½ fl.oz.) of each of the fluid extracts of Lobelia, Sanguinaria, Dracontium, Asarum, and Asclepias Tuberosa, with 600 C.c. (20 fl.ozs.) alcohol and 285 C.c. (9½ fl.ozs.) water.—DOSE: 1 to 10 C.c. (15 to 150 minims).

Lobelia and Capsicum, Comp.; Amer. Disp.—Mix 30 C.c. (1 fl.oz.) of each of the fluid extracts of Lobelia, Capsicum, and Dracontium, and 390 C.c. (13 fl.ozs.) diluted alcohol.—DOSE: 2 to 4 C.c. (30 to 60 minims).

Lupulin.—Mix 30 C.c. (1 fl.oz.) fluid extract of Lupulin and 210 C.c. (7 fl.ozs.) alcohol.—Dose: 2 to 10 C.c. (½ to 2½ fl.drs.).

Mandrake (see Podophyllum).

Marygold (see Calendula).

Matico; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Matico and 285 C.c. (9½ fl.ozs.) diluted alcohol.—Dose: 5 to 15 C.c. (1 to 4 fl.drs.).

May-apple Root (see Podophyllum).

Musk-root (see Sumbul).

Night-blooming Cereus (see Cactus Grandiflora).

Nutgall; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Nutgall and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose: 2 to 10 C.c. (½ to 2½ fl.drs.); mainly used in dilution as a wash or gargle.

Nux Vomica; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Nux Vomica and 315 C.c. (10½ fl.ozs.) alcohol.—Dose: 0.3 to 1.3 C.c. (5 to 20 minims).

Orange Peel, Bitter; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Bitter Orange Peel and 255 C.c. (8½ fl.ozs.) diluted alcohol.—Dose: 5 to 10 C.c. (1 to 2½ fl.drs.).

Orris Root.—Mix equal volumes of fluid extract of Orris Root and diluted alcohol.—This is a strong (fifty per cent.) tincture, which is used only in perfumery.

Pellitory (see Pyrethrum).

Physostigma; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Physostigma and 330 C.c. (11 fl.ozs.) alcohol.—Dose: 1 to 2 C.c. (15 to 30 minims).

Phytolacca Berry.—Mix 30 C.c. (1 fl.oz.) fluid extract of Phytolacca Berry and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose: 2 to 10 C.c. (½ to 2½ fl.drs.).

Phytolacca Root.—Mix 30 C.c. (1 fl.oz.) fluid extract of Phytolacca Root and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose: 2 to 10 C.c. (½ to 2½ fl.drs.).

Pilocarpus.—Mix 30 C.c. (1 fl.oz.) fluid extract of Pilocarpus and 210 C.c. (7 fl. ozs.) diluted alcohol.—Dose: 5 to 15 C.c. (1 to 4 fl.drs.).

Podophyllum.—Mix 30 C.c. (1 fl.oz.) fluid extract of Podophyllum and 150 C.c. (5 fl.ozs.) alcohol.—Dose: 2 to 8 C.c. (30 to 120 minims).

Poison Oak (see Toxicodendron).

Poke Berries (see Phytolacca Berry).

Poke Root (see Phytolacca Root).

Prickly Ash Berries (see Xanthoxylum Fruit).

Pulsatilla.—Mix 30 C.c. (1 fl.oz.) fluid extract of Pulsatilla and 210 C.c. (7 fl.ozs.) diluted alcohol.—Dose : 1 to 3 C.c. (10 to 45 minims).

Pyrethrum ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Pyrethrum, and 150 C.c. (5 fl.ozs.) alcohol.—Used in dilution as a gargle or mouth-wash.

Quassia ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Quassia and 285 C.c. (9½ fl.ozs.) diluted alcohol.—Dose : 5 to 10 C.c. (1 to 2½ fl.drs.).

Queen's Root (see Stillingia).

Quillaia.—Mix 30 C.c. (1 fl.oz.) fluid extract of Quillaia and 120 C.c. (4 fl.ozs.) diluted alcohol.—Dose : 5 to 10 C.c. (1 to 2½ fl.drs.).

Rhatany (see Krameria).

Rhubarb ; U. S.—Mix 45 C.c. (1½ fl.oz.) fluid extract of Rhubarb ; 8 C.c. (2 fl.drs.) fluid extract of Cardamom ; and 360 C.c. (12 fl.ozs.) diluted alcohol.—Dose : 5 to 25 C.c. (1 to 6 fl.drs.).

Rhubarb, Comp. ; Amer. Disp.—Mix 30 C.c. (1 fl.oz.) fluid extract Rhubarb ; 15 C.c. (½ fl.oz.) of each of the fluid extracts of Apocynum androsæmifolium, Hydrastis, Gentian, and Xanthoxylum Berry ; 8 C.c. (¼ fl.oz.) of each of the fluid extracts of Sassafras and Cardamom ; and 495 C.c. (or 16½ fl.ozs.) diluted alcohol. —Dose : 15 to 30 C.c. (½ to 1 fl.oz.).

Rhubarb, Sweet ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Rhubarb ; 15 C.c. (½ fl.oz.) of each of the fluid extracts of Glycyrrhiza and Anise ; 4 C.c. (1 fl.dr.) fluid extract of Cardamom ; and 315 C.c. (10½ fl.ozs.) diluted alcohol.—Dose : 5 to 25 C.c. (1 to 6 fl.drs.).

Rhus Toxicodendron (see Toxicodendron).

Sanguinaria ; U. S.—Mix 45 C.c. (1½ fl.oz.) fluid extract of Sanguinaria and 300 C.c. (10 fl.ozs.) alcohol.—The pharmacopœial menstruum for this tincture (2½ measures alcohol diluted with 1 measure water) is too weak.—Dose: 0.5 to 4 C.c. (8 to 60 minims).

Sanguinaria, Comp. ; Amer. Disp.—Mix 30 C.c. (1 fl.oz.) of each of the fluid extracts of Sanguinaria, Lobelia, and Dracontium with 300 C.c. (10 fl.ozs.) alcohol and 90 C.c. (3 fl.ozs.) water. —The menstruum given in the American Dispensatory is too weak.—Dose : As an emetic, 4 to 6 C.c. (1 to 2 fl.drs.) ; as an expectorant, 1 to 4 C.c. (15 to 60 minims).

Serpentaria ; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Serpentaria and 285 C.c. (9½ fl.ozs.) alcohol.—The pharmacopœial menstruum (diluted alcohol) is too weak.—Dose : 2 to 10 C.c. (½ to 2½ fl.drs.).

Snake Root (see Serpentaria).

Soap Bark (see Quillaia).

Squill; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Squill and 180 C.c. (6 fl.ozs.) diluted alcohol.—Dose: 0.5 to 2 C.c. (8 to 30 minims).

Skunk Cabbage (see Dracontium).

Staphisagria; Amer. Disp.—Mix 150 C.c. (5 fl.ozs.) fluid extract of Stavesacre Seed and 90 C.c. (3 fl.ozs.) alcohol.—Dose: 0.1 to 0.3 C.c. (2 to 5 minims).

Stillingia; Amer. Disp.—Mix 90 C.c. (3 fl.ozs.) fluid extract of Stillingia and 390 C.c. (13 fl.ozs.) diluted alcohol.—Dose: 0.5 to 2 C.c. (8 to 30 minims).

Stramonium [Seed]; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Stramonium [Seed] and 285 C.c. (9½ fl.ozs.) diluted alcohol.—Dose: 0.5 to 2 C.c. (8 to 30 minims).

Symplocarpus (see Dracontium).

Sumbul; U. S.—Mix 30 C.c. (1 fl.oz.) fluid extract of Sumbul and 330 C.c. (11 fl.ozs.) alcohol.—Dose: 2 to 10 C.c. (½ to 2½ fl.drs.).

Toxicodendron.—Mix 30 C.c. (1 fl.oz.) fluid extract of Toxicodendron and 210 C.c. (7 fl.ozs.) diluted alcohol.—Dose: 0.5 to 3 C.c. (8 to 45 minims).

Valerian; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Valerian; 210 C.c. (7 fl.ozs.) alcohol; and 60 C.c. (2 fl.ozs.) water.—Dose: 5 to 15 C.c. (1 to 4 fl.drs.).

Veratrum Viride; U. S.—Mix 60 C.c. (2 fl.ozs.) fluid extract of Veratrum Viride and 80 C.c. (2¾ fl.ozs.) alcohol.—Dose: 0.1 to 0.5 C.c. (2 to 8 minims).

Tincturæ Herbarum Recentium; U. S.

Tinctures of Fresh Herbs.

"Green Tinctures."

It is known that many plants in the fresh state possess quite different properties from those exhibited by them after being dried. The fresh leaves of *Rhus Toxicodendron* are exceedingly potent in their action, as evidenced by the poisoning frequently resulting from simply passing by the growing plant, several feet away from it, and the effects are so alarming that to know the "poison oak" or "poison ivy" is to fear it. And yet the dried plant may be absolutely inert. The freshly gathered bark of *Rhamnus Frangula* is a violent and acrid emetico-cathartic, while the same bark, after being kept a year or two, is one of the most valuable mild laxatives, without griping or nauseating effects.

The fresh root of bryonia is so powerful as to rank as a poison, but may lose its virtues almost entirely in drying, or at least after long keeping.

These facts have not received the attention their importance merits. A few drugs are now used in the form of "green tinctures," as they are called, but the whole subject deserves to be thoroughly investigated.

It is not to be presumed that all drugs are better when fresh than when dried. It seems to be a fact, however, that in many cases the drug when fresh has greater activity than it possesses after drying; that the properties of the fresh drug may differ from those of the dried, not only in degree but in kind; and that many valuable additions to the materia medica may be discovered in this direction by the exercise of intelligence, skill, and good judgment.

The preparation of "tinctures of fresh herbs" (which title, by the way, should have read *tinctures from fresh drugs*, as roots are hardly to be styled as herbs, and the tinctures of fresh roots are evidently not to be excluded) offers many practical difficulties, one of which is the fact that the large quantity of moisture contained in fresh plant parts so largely dilutes our best known menstruum—alcohol.

The adoption of a general formula, such as laid down in the Pharmacopœia, will do much to encourage experiments which will throw light on this subject. It is probable, however, that in this as in numerous other cases in manipulative pharmacy the shoe made for one foot will not fit another. Different menstrua and different treatment will be found necessary in different cases.

Tolutanum Balsamum; U. S.

Balsam of Tolu.

Tolubalsamum—Tolubalsam, G. and Sw.; *Baume de Tolu, Baume de Carthagène*, F.; *Balsamo de tolu*, Sp.

Origin.—*Myroxylon toluifera*, Kunth (*Leguminosæ*).

Habitat.—Venezuela and New Granada.

Description.—See the Pharmacopœia, page 53.

Tests.—Pure tolubalsam turns cherry-red with sulphuric acid, retaining its aroma; but when turpentine or Burgundy pitch is present it turns black and develops an odor of sulphurous acid.

Constituents.—Cinnamic acid; about one per cent. of a volatile oil (*tolene*); one resin readily soluble in alcohol, and another insoluble in alcohol; benzoate and cinnamate of benzyl, and a little benzoic acid.

Water takes up most of the volatile oil and some cinnamic acid when tolu is digested with it, as in making syrup of tolu.

Medicinal Uses.—It possesses but slight medicinal virtues, and is mainly employed as a pleasant excipient, in the form of syrup, in cough mixtures, etc. Its dose as a blennorrhetic in *chronic bronchitis* is ten to thirty grains (0.66 to 2 grams), in emulsion, but it is not much used in this form.

TOLUTANA AQUA.

Tolu Water.

Digest forty grams (1 ounce 180 grains) tolubalsam for two hours with one liter (34 fluidounces) water in a covered vessel, at a temperature not exceeding 82° C. (180° F.), stirring occasionally. Let cool, and filter. A pleasant aromatic water for flavoring, and for making solutions.

TOLUTANA TINCTURA; U. S.

Tincture of Tolu.

Macerate one hundred grams (3 ounces 230 grains) tolubalsam in one thousand cubic centimeters (34 fluidounces) alcohol until dissolved. Filter through paper, adding enough alcohol through the filter to make the final product weigh one thousand grams (35 ounces 120 grains, measuring about 40 fluidounces).

Used for flavoring.

TOLUTANUS SYRUPUS; U. S.

Syrup of Tolu.

The official formula is a failure ; it gives a turbid syrup which cannot be clarified. Modified as follows it works very well :

Digest forty grams (1 ounce 180 grains) tolubalsam for two hours with three hundred and fifty-five cubic centimeters (12 fluidounces) water in a covered vessel at a temperature not exceeding 82° C. (180° F.). Filter, and dissolve six hundred and fifty grams (23 ounces) sugar in the filtrate. Finally strain, adding enough water through the strainer to make the final product weigh one thousand grams (35 ounces 120 grains—measuring 763.4 cubic centimeters, or about 26 fluidounces).

If great heat is employed in this process, the syrup will acquire a disagreeable odor after a short time.

Used as a flavoring excipient.

Tonga.

TONGA.

A mixed drug said to be obtained from the Fiji Islands. It seems to consist of thin fibrous barks in long bundles. The plants from which these barks are obtained are as yet not fully identified, and hence it is not known which is the active ingredient in the drug. That it has marked effect in relieving neuralgia has been stated on the authority of several physicians, among whom are Drs. Sidney Ringer and William Murrell, of London. Others deny that the drug has any value.

TONGÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF TONGA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Moisten the drug with two hundred grams (about 7½ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred cubic centimeters (13½ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Each cubic centimeter of this fluid extract represents the soluble matter of one gram of the drug. Each fluidounce represents four hundred and fifty-five and two-thirds grains, and each fluidrachm nearly fifty-seven grains.

Dose.—One to two cubic centimeters (15 to 30 minims).

Tormentilla.

TORMENTIL.

Tormentillæ Rhizoma.

Origin.—*Potentilla Tormentilla*, Sibthorp (*Rosaceæ*).

Habitat.—Europe.

Part used.—The rhizome.

Description.—Simple, or rarely branched, cylindrical or flattened, tapering; five to eight centimeters (2 to 3 inches) long, and about fifteen millimeters (⅗ inch) thick, roughly marked by roundish elevations and ridges, and with the scars of stems and rootlets; externally dark grayish-brown; internally light brownish-red; bark thick; wood bun-

dles small; pith about the same thickness as the bark; inodorous; taste astringent.

Constituents.—About twenty-five per cent. tannin, etc.

Medicinal Uses.—Powerfully astringent.

Dose.—One to two grams (15 to 30 grains).

TORMENTILLÆ EXTRACTUM FLUIDUM.

FLUID EXTRACT OF TORMENTILLA.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to two cubic centimeters (15 to 30 minims).

Toxicodendron.

See "Rhus Toxicodendron."

Tragacantha; U. S.

TRAGACANTH.

Traganth, G.; *Gomme adragante*, F.; *Tragacanto, Gomo Tragacanto, Alquitira*, Sp.; *Dragant*, Sw.; *Gum Tragacanth.*

Origin.—*Astragalus gummifer*, Lobillardière, and other species of *Astragalus* (*Leguminosæ*).

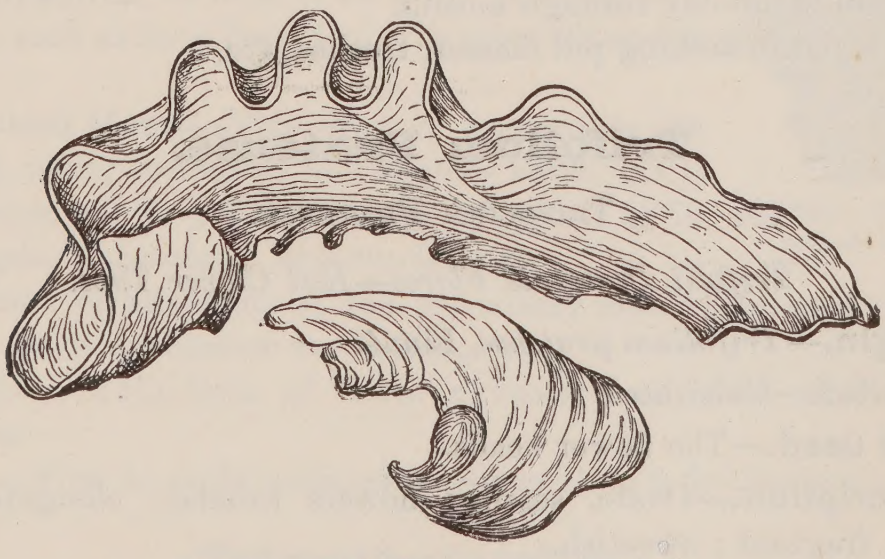


FIG. 536.—Flake Tragacanth, natural size.

Habitat.—Western Asia.

Description.—A gum or gum-like exudation from incisions made into the stem. (See the Pharmacopœia, page 358.) The pharmaco-

pœial description states that the fluid portion of tragacanth mucilage is *not* precipitated by alcohol. This is an inadvertent error; the word "not" should be omitted.

Varieties.—"Ribbon" or "flake" tragacanth consists of clean, white bands, or spirals, as seen in the figure.

Tragacanth "in sorts" is more or less discolored, and consists of irregular pieces.

Constituents.—Rather more than one-half of the gum is insoluble in cold water, and consists of tragacanthin (also sometimes called *bassorin*); about one-third of the gum is soluble in water, and consists of a calcium salt of gummic acid (not the same as the calcium salt of Arabic acid, which constitutes acacia).

Used as a mucilaginous excipient.

TRAGACANTHÆ MUCILAGO; U. S.

MUCILAGE OF TRAGACANTH.

Mix eighteen grams (278 grains) glycerin with seventy-six grams (2 ounces 300 grains) water; heat the mixture to the boiling point, and then add six grams (92½ grains) selected clean white pieces of tragacanth ("ribbon"), and macerate twenty-four hours with occasional stirring. Finally add enough water to make the whole product weigh one hundred grams (3 ounces 230 grains), beat the mass with a horn spatula in a porcelain jar until it acquires a uniformly smooth consistence, and then strain it forcibly through muslin.

Employed in making pill masses, troches, etc.

Trifolium Pratense.

TRIFOLIUM PRATENSE.

Trifolii Pratensis Flores—Red Clover Tops.

Origin.—*Trifolium pratense*, Linné.

Habitat.—Cultivated.

Part used.—The flower heads.

Description.—Ovate, sessile; flowers tubular, elongated, rose-purple; fragrant; sweetish.

Medicinal Uses.—Red clover has been strongly recommended as a remedy for *whooping-cough*.

The fluid extract diluted with water is also used as a vulnerary in ill-conditioned *sores* and *ulcers*.

Best given in the form of FLUID EXTRACT made with diluted alcohol as a menstruum.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

TRIFOLII PRATENSIS EXTRACTUM.

EXTRACT OF TRIFOLIUM PRATENSE.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

Trillium.

TRILLIUM.

Trillii Rhizoma—Beth Root, Birth Root.

Origin.—*Trillium erectum*, Linné (*Liliaceæ*).

Habitat.—The United States.

Part used.—The rhizome.

Description.—From two to five centimeters ($\frac{4}{5}$ to 2 inches) long, about two centimeters ($\frac{4}{5}$ inch) in diameter, oblong, somewhat flattened; externally light yellowish-brown, internally whitish; formed and marked as seen in the figure. Inodorous; taste somewhat astringent, afterward bitter and acrid.

FIG. 537.—Trillium, natural size.

Constituents.—Probably an acrid principle analogous to such as have been found in other liliaceous plants.

Medicinal Uses.—This drug is reputed to be astringent, tonic, antiseptic, and slightly acrid. It is mainly employed in *genito-urinary affections*, as in *menorrhagia*, *leucorrhœa*, *hæmaturia*, etc.

Also used in affections of the pulmonary mucous membranes, and externally as an application to wounds, etc.

Best given in the form of FLUID EXTRACT made with alcohol as a menstruum.

Dose.—Four to eight cubic centimeters (1 to 2 fluidrachms).

Trimethylamina.

TRIMETHYLAMINE.

A colorless, volatile alkaloid of strong reaction, having the disagreeable peculiar odor of herring pickle, in which, in fact, a large quantity

of trimethylamine exists, and from which it may be conveniently obtained. It is readily soluble in water, alcohol, and ether.

A solution of trimethylamine in water is sold in the trade under the erroneous name or PROPYLAMINE. Propylamine is isomeric with trimethylamine, and the latter was formerly described under the name of "propylamine," whence the confusion. Propylamine is not used in medicine at all. The best form in which to use the trimethylamine, to insure definite strength and reliable results, is the

Trimethylaminæ Hydrochloras.

HYDROCHLORATE OF TRIMETHYLAMINE.

This is obtained by neutralizing trimethylamine (that sold under the name of "propylamine" will answer) with hydrochloric acid, and then carefully evaporating the liquid to crystallization.

This salt crystallizes in white or colorless prisms, is very deliquescent, dissolves readily in water or in alcohol, is nearly odorless, and has a somewhat pungent salty taste.

Uses.—Is strongly recommended by some as almost a specific remedy in articular rheumatism and gout.

Dose.—The hydrochlorate is given in doses of 0.10 to 0.20 gram (2 to 3 grains) repeated so as to give at least one gram (15 grains) per day. It is best given in some syrup, or in elixir of orange.

Triticum ; U. S.

TRITICUM.

Tritici Repentis Radix, Radix Graminis—*Queckenwurzel, Grasswurzel*, G.; *Chiendent*, F.; *Quickrot*, Sw.; *Couch-grass. Dog-grass, Quick-grass, Quickens, Quitch.*

Origin.—*Triticum repens*, Linné (*Graminaceæ*).

Habitat.—Northern hemisphere.

Part used.—The underground stems (stolons).

Description.—Pale, straw-colored, jointed, branched, wrinkled lengthwise. A transverse section shows a thick bark, a thin woody layer, and a hollow center.

Constituents.—About twenty-two per cent. of various sugars. Devoid of starch and resinous matter.

Medicinal Properties.—Emollient, antiphlogistic, and diuretic.

TRITICI DECOCTUM.

DECOCTION OF TRITICUM.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Fifty to one hundred and fifty cubic centimeters ($1\frac{1}{2}$ to 5 fluidounces), or *ad libitum.*

TRITICI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF TRITICUM.

Pack five hundred grams ($17\frac{2}{3}$ avoirdupois ounces) of finely cut dog-grass root in a cylindrical percolator and percolate it with boiling water until exhausted. Evaporate the percolate to four hundred cubic centimeters ($13\frac{1}{2}$ fluidounces), and then add to it one hundred cubic centimeters ($4\frac{1}{6}$ fluidounces) of alcohol, shake, and set the mixture aside for forty-eight hours. Then filter, adding to the filtrate enough of a mixture of alcohol and water in the proportion of seventy-five grams ($3\frac{1}{8}$ fluidounces) alcohol to every three hundred grams (10 fluidounces) of water to make the whole product measure five hundred cubic centimeters (17 fluidounces).

This is a very pleasant preparation, tasting and smelling like infusion of malt.

Dose.—Five to fifteen cubic centimeters ($1\frac{1}{4}$ to 4 fluidrachms).

Tritici Farina.

WHEAT FLOUR.

Origin.—*Triticum vulgare*, Villars (*Graminaceæ*).

Description.—A fine white flour prepared from the seed. Impalpable, inodorous, of insipid taste.

Constituents.—About seventy per cent. starch, twelve per cent. gluten, two per cent. fixed oil, besides sugar, cellulose, and water. Yields one and one-half to two per cent. ash containing about fifty per cent. phosphoric acid. Wheat is the most nutritious of all cereals, containing the largest percentage of nitrogenous matters.

Medicinal Uses.—As an application to *inflamed* or *excoriated surfaces* to allay the heat and pain.

Trituratione ; U. S.

TRITURATIONS.

A new class of preparations introduced in the Pharmacopœia for the first time in the latest revision. They are simply dilutions of potent remedies in the form of powder, the diluent being milk sugar.

The object of the trituration with milk sugar is not only to dilute the medicine so that the dose may be sufficiently enlarged to render it easy to dispense it with safe accuracy, but also to reduce it to a great degree of fineness, whereby the action of the medicine is increased and yet better distributed, so that local irritation, from the direct contact of the powerful medicinal substance in one spot of the mucous membrane of the stomach, is prevented.

There is at present but one official trituration, viz., that of elaterine.

Trochisci ; U. S.

TROCHES.

Rotulæ, Tabulæ, Pastilli—Tablets, Lozenges.

Small flattened cakes, either round, oblong, rectangular, or in other forms ; prepared with sugar ; dried so as to permanently retain their form ; usually flavored with some aromatic substance.

They are not specially effective forms of medication, except in cases where it is desirable that the medicinal substance they contain shall remain a comparatively long time in contact with the surfaces of the throat, as is the case with chlorate of potassium tablets.

The formidable array of troches in our Pharmacopœia is hardly warranted by the demand for this class of preparations ; and yet we believe nearly all of the official troches to be useful. They are certainly convenient to carry about.

Tussilago.

TUSSILAGO.

Tussilaginis Folia—Huflattig, Rosshuf, G.; *Tussilage, Pas d'âne,* F.; *Hästhofsört* Sw.; *Coltsfoot.*

Origin.—*Tussilago farfara,* Linné (*Compositæ*).

Habitat.—Europe, North America.

Part used.—Leaves.

Description.—The leaves are rounded, cordate, much wrinkled when dried, dark green, smooth on the upper surface and covered with matted woolly hairs beneath. Sometimes the whole flowering tops are

collected. The flowers are yellow. The drug has no odor; the taste is mucilaginous, bitter.

Constituents.—Mucilage and bitter extractive.

Medicinal Uses.—Much employed as an ingredient of pectoral teas in *pulmonary affections*, *chronic bronchitis*, and *coughs*. Externally the leaves are used in the form of poultices for *scrofulous ulcers*.

Dose.—Two to eight grams (30 to 120 grains) in decoction, or in the form of a FLUID EXTRACT made with diluted alcohol.

Ulmus; U. S.

ELM.

Ulmi Cortex—Slippery Elm.

Origin.—*Ulmus fulva*, Michaux (*Urticaceæ*).

Habitat.—North America.

Part used.—The inner bark.

Description.—See the Pharmacopœia, page 365.

Constituents.—Mucilage.

Medicinal Uses.—Demulcent and emollient. Used externally as an ingredient of poultices.

ULMI DECOCTUM.

DECOCTION OF ELM BARK.

From fifty grams (or about $1\frac{3}{4}$ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—*Ad libitum* as a demulcent.

ULMI MUCILAGO; U. S.

MUCILAGE OF ELM.

Macerate eighteen grams (280 grains) sliced and dried slippery elm bark with three hundred cubic centimeters (10 fluidounces) boiling water for two hours, in a covered vessel, without stirring, and then strain without pressure.

Uncaria.

GAMBIR.

Pale Catechu.

See Catechu Pallidum.

Unguenta.

OINTMENTS.

Salben, G.; *Pommades, Onguents*, F.; *Unguentos*, Sp.; *Salvor*, Sw.; *Salves.*

Soft, fatty mixtures with a melting point below the ordinary temperature of the human body. Applied by inunction.

Lard is the basis of several; others consist of lard and wax, or of certain fixed oils with some solid fatty substance, such as wax or spermaceti, or of petroleum ointment, or of lead plaster with some fixed oil.

Lard is difficult to obtain of good quality, but it softens the skin better than any other unctuous substance, and is probably the best basis for all ointments, although it soon becomes rancid, so that all ointments made with lard must be freshly made when required for use.

Petroleum ointment keeps permanently, but is by no means as suitable, because it does not soften and penetrate the skin nearly as readily as lard.

Ustilago; U. S.

CORNSMUT.

Corn Ergot.

Origin.—*Ustilago Maydis*, Léveillé (*Fungi*).

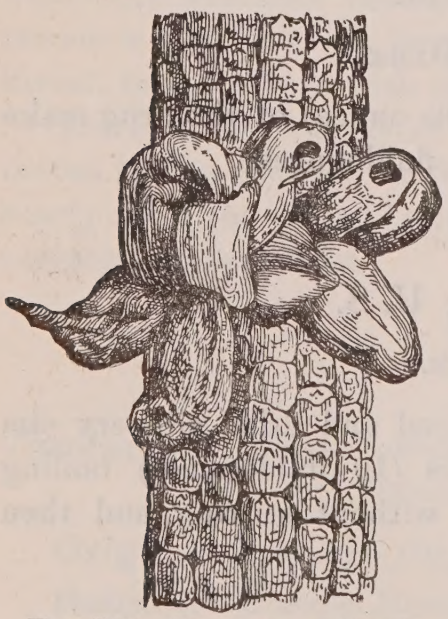


FIG. 538.—Cornsmut, reduced. (Appearance on ear of corn.)

Habitat.—Grows on all parts of corn (Zea Mays), especially upon the ear.

Description.—See the Pharmacopœia, page 372. Nearly odorless when dry; taste disagreeable. The drug is frequently mixed with pieces of the corn-cob, and is mostly a dark brown or brownish-black fine powder.

Constituents.—About 4.2 per cent. of fixed oil, also an amine-like, volatile substance soluble in ether, and about five and a half per cent. of an amorphous red-brown substance resembling the *sclerotic acid* of ergot.—H. B. Parsons.

Medicinal Uses.—Same as of ergot in midwifery practice. Ustilago possesses the advantage over ergot of increasing the force without increasing the duration of uterine contractions, or "pains." Indications and counter-indications for its use are similar to those of ergot.

Dose.—One to five grams (15 to 75 grains); average dose about two grams (30 grains).

USTILAGINIS EXTRACTUM FLUIDUM.

FLUID EXTRACT OF USTILAGO.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use diluted alcohol.

Dose.—One to five cubic centimeters (15 to 75 minims).

Uva Ursi; U. S.

UVA URSI.

Uvæ Ursi Folia—Bearberry.

Origin.—*Arctostaphylos Uva-ursi*, Sprengel (*Ericaceæ*).

Habitat.—Northern Europe and America.

Part used.—The leaves.

Description.—See the Pharmacopœia, page 372. Also see figure.

Constituents.—About six to seven per cent. *tannin*; also gallic acid, *arbutin*, *ericolin*, and *ursone*. The arbutin and ericolin are bitter crystalline principles, soluble in water and in alcohol.

FIG. 539.—Uva Ursi Leaf, natural size.

Medicinal Uses.—Astringent, and in small doses stomachic and tonic. Its most valuable effect is that which is exerted on the urinary organs from the kidney to the urethra. It is especially valuable in *chronic pyelitis*, *cystitis*, *dysuria*, *strangury*, and *incontinence of urine* depending on an irritated condition of the bladder. It is said to be especially prompt in relieving the strangury occasionally following the application of a blister.

Dose.—Two to five grams (30 to 75 grains).

UVÆ URSI DECOCTUM.

DECOCTION OF UVA URSI.

From thirty grams (or about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

About the same strength as the preparation of 1870.

Dose.—Twenty-five to fifty cubic centimeters (6 to 12 fluidrachms).

UVÆ URSI EXTRACTUM.

EXTRACT OF UVA URSI.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Greenish-brown—almost black.

Dose.—0.5 to 2 grams (10 to 30 grains).

UVÆ URSI EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF UVA URSI.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *first menstruum* use a mixture of two hundred and twenty-five grams (about 9⅓ fluidounces) alcohol, two hundred and twenty-five grams (about 7½ fluidounces) water, and fifty grams (about 1⅘ avoirdupois ounce) glycerin.

As a *second menstruum* use alcohol and water mixed in the proportion of one hundred grams (about 4⅙ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and seventy-five grams (about 6½ fluidounces) of the *first menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve three hundred and fifty cubic centimeters (12 fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *second menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to five cubic centimeters (30 to 75 minims).

Valeriana; U. S.

VALERIAN.

Valerianæ Radix—Baldrianwurzel, G.; *Racine de Valériane*, F.; *Vändelrot*, Sw.

Origin.—*Valeriana officinalis*, Linné (*Valerianaceæ*).

Habitat.—Europe, Northern Asia, and North America in the New England States, especially Vermont.

Part used.—The root (rhizome and rootlets).

Description.—See the Pharmacopœia, page 373. The rhizome is often hidden among the twisted rootlets. It is quite frequently met with sliced into longitudinal halves, in which case the cut surface becomes concave on drying, as shown in Figure 540. Odor strong, peculiar, unpleasant ; taste sweetish-bitter, camphoraceous.

Valerian is best when collected in the fall, and in dry localities ; the adhering earth should be simply shaken (not washed) off ; and the drug dried in the shade.

Valerian with a small rhizome and few rootlets of a lighter color is usually supposed to be better than one with larger rhizomes and numerous dark-colored rootlets. A dark color is always indicative of doubtful quality.

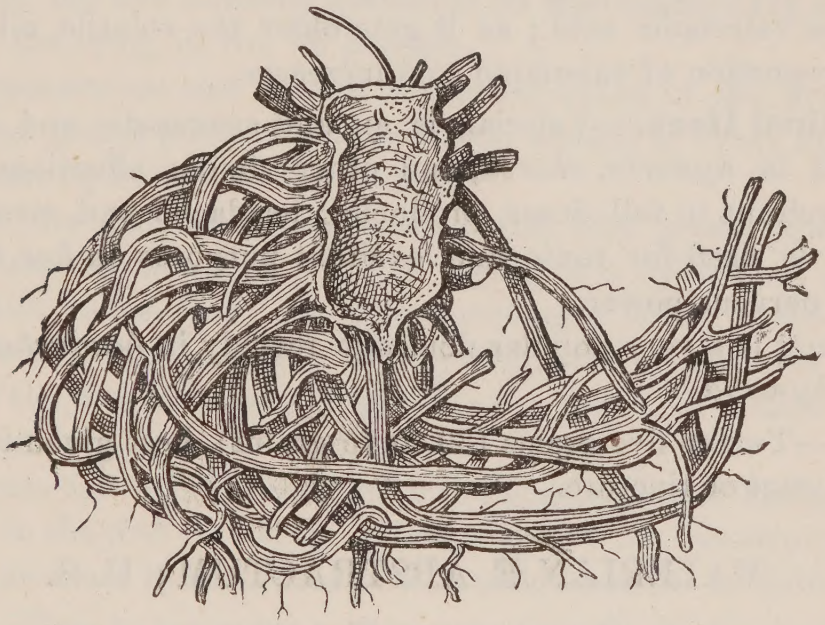


FIG. 540.—Valerian, natural size. (Vermont valerian.)

Trade Varieties.—*English valerian* brings the highest price in the American market, being worth about fifty per cent. more than either the *German* or the *Vermont*. There is no good reason for this partiality, if the general characteristics are such as described above. The odor should be strong, but becomes more offensive after long keeping. *Vermont valerian* is of excellent quality, being plump, light-colored, and of good odor ; it is large and has numerous rootlets. In our opinion it is the best valerian obtainable in this market.

The term "Radix Valerianæ Minoris," which at one time grew to be construed as applicable only to the best grade of root of Valeriana officinalis, whence the opinion gained ground that small valerian is the best, was originally applied to all root of Valeriana officinalis, to distinguish that from the roots of *Valeriana phu* and *Valeriana celtica*, which were called "Radix Valerianæ Majoris."

Constituents.—The medicinal properties are due to the *valerianic acid* and the *volatile oil of valerian.*

Fresh valerian has but a faint odor, as *valerianic acid* is formed only on exposure of the *volatile oil.* The volatile oil is pale-yellowish, or yellowish brown, occasionally greenish, becomes thick when long kept, and then acquires the strong odor of valerianic acid, and an acid reaction. It is a mixture of *valeren, valerian-camphor,* valerianic acid, resin, and water. The camphor, resin, and water constitute together what is called *valerol,* which in contact with the air gives rise to *valerianic acid.* When the drug is recently dried it contains more volatile oil and less valerianic acid; as it gets older the volatile oil decreases and the proportion of valerianic acid increases.

Medicinal Uses.—Valerian is an anti-spasmodic and calmative, much used in *hysteria, chorea,* and other similar affections. It is a nervous excitant in full doses, producing headache and mental excitement, and is used for tonic and excitant purposes in *low fevers* with depressed nervous power.

This drug is a very popular domestic remedy in *headaches, nervousness,* and *hysteria.*

Dose.—Two to five grams (30 to 75 grains), best given in the form of fluid extract or tincture.

VALERIANÆ ABSTRACTUM; U. S.

Abstract of Valerian.

Three hundred cubic centimeters (10 fluidounces) of fluid extract of valerian will yield one hundred and fifty grams (5 ounces 130 grains) abstract of valerian on evaporation to dryness with seventy-five grams (2 ounces 280 grains) powdered milk-sugar, and the subsequent addition of enough powdered milk-sugar to make up the requisite weight of the final product.

Abstract is not a good preparation of valerian, as the volatile oil and the valerianic acid upon which the medicinal value of the drug depends are dissipated to a great extent in the evaporation and drying.

Dose.—0.5 to 2 grams (8 to 30 grains).

VALERIANÆ EXTRACTUM.

Extract of Valerian.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown. Yield about twenty per cent.

Dropped from the Pharmacopœia in its last edition, probably inadvertently.

Dose.—0.5 to 2.5 grams (10 to 40 grains).

VALERIANÆ EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Valerian.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Moisten the drug with one hundred and fifty grams (about 6 fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and twenty-five cubic centimeters (14⅓ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—Two to ten cubic centimeters (½ to 2½ fluidrachms).

VALERIANÆ INFUSUM.

Infusion of Valerian.

From thirty grams (about 1 avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Thirty cubic centimeters (1 fluidounce) or more.

VALERIANÆ TINCTURA; U. S.

Tincture of Valerian.

Mix two hundred grams (or about 8⅓ fluidounces) alcohol with one hundred cubic centimeters (3⅓ fluidounces) water. Moisten sixty grams (2 ounces 50 grains) valerian, in No. 60 powder, with forty-five cubic centimeters (1½ fluidounce) of the mixture; macerate twenty-four hours; pack it firmly in a cylindrical percolator and percolate with the remainder of the mixture, and as much more of the same kind of men-

struum as may be necessary, to obtain three hundred grams (10 ounces 250 grains, or about 11 fluidounces) of tincture.

The new preparation is one-third stronger than that of the old Pharmacopœia (1870).

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

VALERIANÆ TINCTURA AMMONIATA; U. S.

AMMONIATED TINCTURE OF VALERIAN.

Moisten sixty grams (2 ounces 50 grains) valerian, in No. 60 powder, with sixty cubic centimeters (2 fluidounces) aromatic spirit of ammonia; macerate in a closed vessel twenty-four hours; then pack it in a cylindrical percolator and percolate with aromatic spirit of ammonia until three hundred grams (or about 10 fluidounces) of tincture has been obtained.

This is one-third stronger than the former tincture (U. S. P., 1870).

Dose.—Five to fifteen cubic centimeters (1 to 4 fluidrachms).

Valerianæ Oleum; U. S.

OIL OF VALERIAN.

Valerianæ Ætheroleum — Volatile Oil of Valerian.

Description.—See the Pharmacopœia, page 245.

Dose.—One to two drops.

Vanilla; U. S.

VANILLA.

Vanillæ Fructus — Vanille, G. and F.; *Vainilla*, Sp.; *Vanilj*, Sw.; *Vanilla Beans.*

Origin.— *Vanilla planifolia*, Andrews (*Orchidaceæ*).

Habitat.—Mexico. Cultivated.

Part used.—The fruit.

Description.—See the Pharmacopœia, page 373.

The fruit is collected before it ripens, and is subjected to a process of sweating by which the aroma is developed.

Vanilla is sorted according to size and quality, and put up in bundles each containing about fifty of the fruits. It is then usually packed in tin boxes.

Varieties.—*Mexican vanilla* is the best; it answers the official description, and is darker and finer than any other kind.

Bourbon vanilla is smaller, lighter in color, and has an odor resembling that of Tonka beans.

Constituents.—About two per cent. *vanillin*, which crystallizes in silky white needles and has the odor of the vanilla. Vanillin is soluble in alcohol. Vanilla also contains fixed oil, resin, sugar, etc.

Used for flavoring.

VANILLÆ TINCTURA; U. S.

TINCTURE OF VANILLA.

Mix four hundred grams (14 ounces, or about 16⅔ fluidounces) alcohol with two hundred cubic centimeters (6⅔ fluidounces) water. Cut sixty grams (2 ounces 50 grains) vanilla into small pieces, and bruise it in a mortar. Then macerate the vanilla with three hundred cubic centimeters (10 fluidounces) of the mixture of alcohol and water for twelve hours, after which drain off the liquid and set it aside. Put the moist vanilla into a mortar and beat it with one hundred and twenty grams (4 ounces 100 grains) sugar until reduced to a uniformly mixed powder. Then pack this into a percolator and percolate it first with the reserved macerate, and afterward with the remainder of the mixture of alcohol and water, continuing the percolation with the same kind of menstruum until six hundred grams (about 20 fluidounces) of tincture has been obtained.

Concentrated Extract of Vanilla for flavoring purposes ought to be at least twice the strength of the official tincture, but may otherwise be made in the same manner.

Vapores.

VAPORS.

A class of preparations used for inhalation, prepared in such a manner that the air of the sick-room is charged with the vapor.

The vapor from slaking lime, which is of much benefit in croupous and diphtheritic membranous exudations, is an example of this class.

Vapors or inhalations are frequently medicated. (See "Inhalations.")

In some forms of inflammation of the nasal or bronchial mucous membranes with scanty secretion, it is often of much benefit to the patient to charge the atmosphere with steam from a tea-kettle or other vessel containing water, chamomile tea, or other fragrant decoctions.

Veratrina; U. S.

VERATRINE.

Veratria, Phar., 1870.

"An alkaloid, or a mixture of alkaloids, prepared from the seeds of *Asagræa officinalis*, Lindley" (*Melanthaceæ*).

Description and Tests.—See the Pharmacopœia, page 373.

Medicinal Uses.—This remedy is a powerful cardiac depressant and poison. Overdoses render the heart's action feeble and irregular, the temperature is reduced, and collapse and death may ensue.

The alkaloid is rarely employed internally, but has been used in *neuralgia*, *rheumatism*, etc.

In the form of ointment it is an active remedy for the relief of *neuralgic pains.*

Dose.—About 0.005 gram ($\frac{1}{12}$ grain), repeated several times a day.

VERATRINÆ OLEATUM; U. S.

OLEATE OF VERATRINE.

Put one gram (15 grains) veratrine in a warmed Wedgewood mortar. Weigh out forty-nine grams (1 ounce 320 grains) oleic acid. Triturate the veratrine with a small quantity of the oleic acid until reduced to a perfectly smooth paste. Then add to it the remainder of the oleic acid, in a porcelain evaporating dish, and continue stirring until the veratrine is all dissolved.

VERATRINÆ UNGUENTUM; U. S.

VERATRINE OINTMENT.

Dissolve one gram (15 grains) veratrine in two cubic centimeters ($\frac{1}{2}$ fluidrachm) warm alcohol, first triturating the veratrine until reduced to powder, so as to facilitate its solution. Then add gradually twenty-four grams (370 grains) benzoinated lard, and mix thoroughly.

Veratrum Viride; U. S.

VERATRUM VIRIDE.

Veratri Viridis Radix—*Grüner Germer*, G.; *Veratre Vert*, F.; *Green Hellebore, American Hellebore, Indian Poke.*

Origin.—*Veratrum viride*, Aiton (*Melanthaceæ*).

Habitat.—North America.

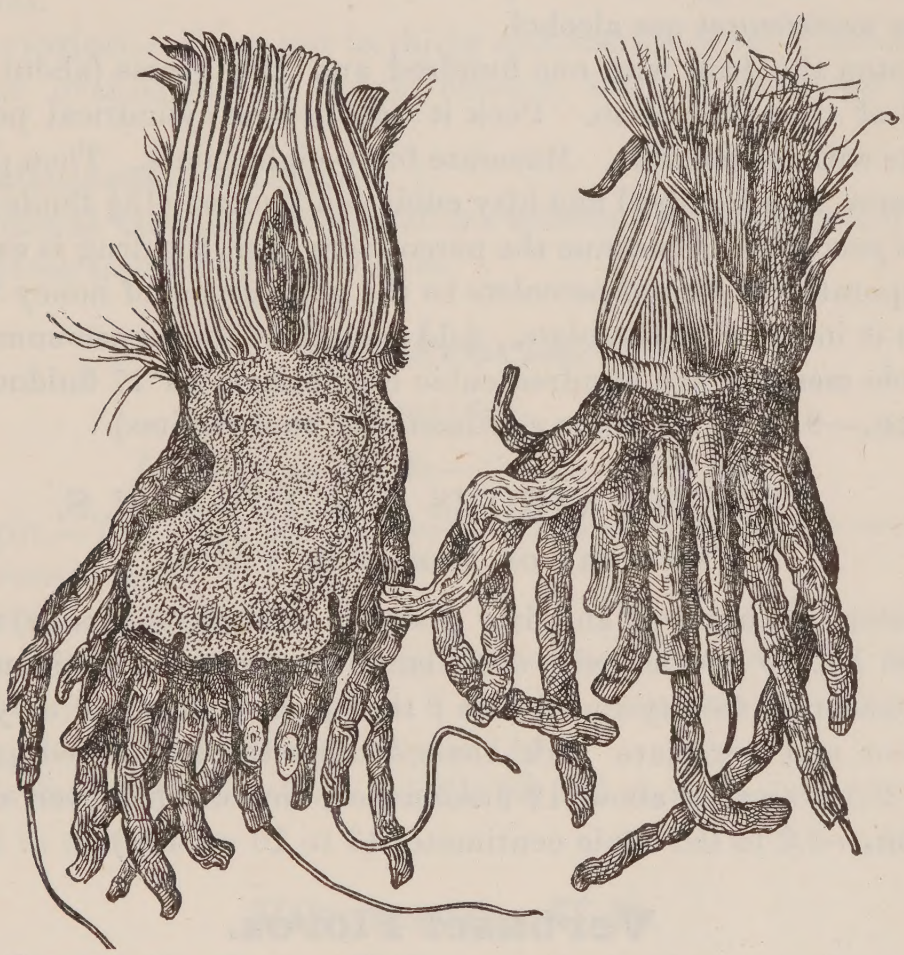
Parts used.—The rhizome and rootlets.

Description.—See the Pharmacopœia, page 374.

Constituents.—The alkaloids *jervine, veratroidine, rubijervine, pseudojervine,* etc.

Medicinal Uses.—Veratrum viride is much used in fevers to reduce arterial excitement and control spasms. It is also used in some forms of heart disease with hypertrophy.

Deaths from this remedy are very rare, or, according to some au-



FIGS. 541, 542.—Veratrum Viride, outer and cut surfaces, natural size.

thorities, entirely unknown. An ounce of the tincture has been given without serious results. This remedy has been praised as a valuable remedy in *puerperal convulsions* in doses of a teaspoonful of the tincture every fifteen minutes until the spasms are under control.

Dose.—0.1 to 0.3 gram (2 to 5 grains), best given in the form of fluid extract or tincture.

VERATRI VIRIDIS EXTRACTUM.

EXTRACT OF VERATRUM VIRIDE.

Evaporate any desired quantity of the fluid extract to the pilular consistence.

Brown.

Dose.—0.01 to 0.05 gram ($\frac{1}{6}$ to 1 grain).

VERATRI VIRIDIS EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF VERATRUM VIRIDE.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and fifty grams (about 6¼ fluidounces) of the menstruum. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate*. Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.10 to 0.3 cubic centimeter (2 to 5 minims).

VERATRI VIRIDIS TINCTURA; U. S.

TINCTURE OF VERATRUM VIRIDE.

Moisten one hundred and fifty grams (5 ounces 130 grains) veratrum viride, in No. 60 powder, with sixty cubic centimeters (2 fluidounces) alcohol; macerate twenty-four hours ; then pack it firmly in a cylindrical percolator and percolate with alcohol until three hundred grams (10 ounces 260 grains, or about 12 fluidounces) tincture has been obtained.

Dose.—0.2 to 0.6 cubic centimeter (3 to 10 minims).

Verbasci Flores.

VERBASCUM FLOWERS.

Wollkraut, Königskretze, G.; *Molène, Bouillon-blanc*, F.; *Verbasco, Gordolobo*, Sp.; *Kungsljus*, Sw.; *Mullein Flowers.*

Origin.— *Verbascum Thapsus*, Linné, and other species of *Verbascum* (*Scrophulariaceæ*).

Habitat.—Europe and America.

Parts used.—The corolla and stamens.

Description.—Wheel-shaped, two to four centimeters (1 to 1½ inch) broad, bright yellow, five-lobed, with a short tube in which the five stamens are inserted. Odor somewhat fragrant ; taste sweetish, mucilaginous.

Constituents.—Mucilage, a trace of volatile oil, etc.

Medicinal Uses.—Demulcent. Used as an ingredient of pectoral teas.

Verbasci Folia.

VERBASCUM LEAVES.

Mullein Leaves.

From *Verbascum Thapsus*, Linné, and other species of *Verbascum* (see above).

Description.—From ten to thirty centimeters (4 to 12 inches) long, oblong or oval-lanceolate, acute, crenate, hairy. Inodorous; mucilaginous.

Constituents.—Mucilage.

Medicinal Uses.—Same as of the flowers. Both leaves and flowers may be given in infusion *ad libitum*.

Vettiveria.

VETIVERT.

Ivarancusæ Radix—Cuscus, Vetti-ver.

Origin.—The long, slender, fibrous roots of *Andropogon muricatus*, Retz (*Graminaceæ*).

Habitat.—East India.

Description.—Light yellowish-brown, tough, somewhat wavy, fifteen to twenty centimeters (6 to 8 inches) long, and about one millimeter ($\frac{1}{25}$ inch) thick. Has a fragrant odor.

Constituents.—Contains volatile oil and resin.

Used in perfumery.

Viburnum; U. S.

VIBURNUM.

Viburni Prunifolii Cortex—Black Haw Bark.

Origin.—*Viburnum prunifolium*, Linné (*Caprifoliaceæ*).

Habitat.—The United States.

Part used.—The bark.

Description.—See the Pharmacopœia, page 374.

Nomenclature.—This drug should have been called *Viburnum prunifolium* to distinguish it from *Viburnum opulus*, which is also used in considerable quantities.

Constituents.—Valerianic acid, bitter principle, resin, tannin, etc.

Medicinal Uses.—This remedy is said to be a nervine tonic. It is almost exclusively used, however, with a view of preventing abortion or miscarriage, for which purpose it is an excellent remedy. When there is known to be a disposition to these accidents, this remedy should be

given in moderate daily doses for several weeks before the time of the expected miscarriage.

The remedy has also been used in *uterine derangements, dysmenorrhœa,* etc.

Dose.—Two to eight grams (30 to 120 grains) several times a day, best given in fluid extract.

VIBURNI PRUNIFOLII EXTRACTUM.

EXTRACT OF VIBURNUM PRUNIFOLIUM.

Evaporate any desired quantity of the fluid extract to the pilular consistence, and then incorporate with it, while still warm, one-twentieth part of its weight of glycerin.

Brown.

Dose.—0.10 to 0.75 gram (2 to 12 grains).

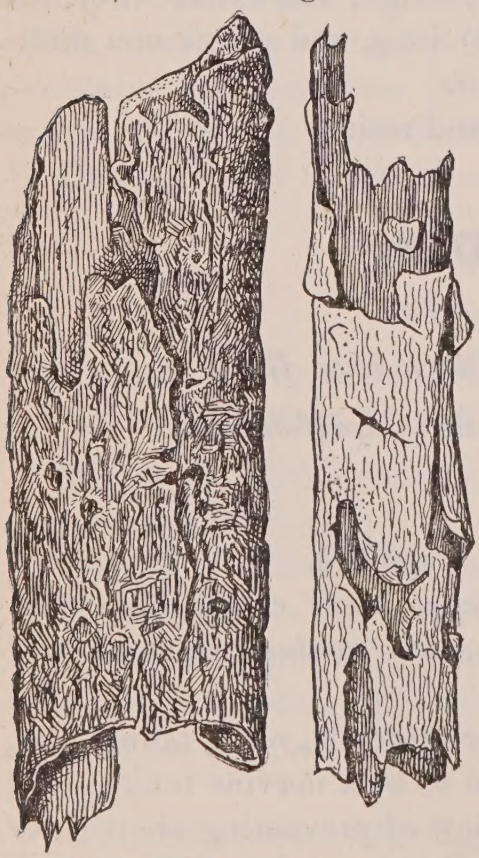
VIBURNI [PRUNIFOLII] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF VIBURNUM [PRUNIFOLIUM].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).



FIGS. 543, 544.—Viburnum Opulus, older and younger pieces, natural size.

Viburnum Opulus.

VIBURNUM OPULUS.

Viburnum Opuli Cortex—Cramp Bark.

Origin.—*Viburnum opulus,* Linné (*Caprifoliaceæ*).

Habitat.—Europe and North America.

Part used.—The bark.

Description.—Quills or troughs, ten to twenty centimeters (4 to 8 inches) long, and about twelve millimeters (½

inch) broad ; externally greenish-gray or brownish-gray, rough, brittle, marked as seen in the illustration, which shows both old and young bark ; inodorous ; taste bitter, pungent.

Constituents.—A bitter principle, pungent resin, valerianic acid, etc.

Medicinal Uses.—Cramp bark is so called on account of the antispasmodic properties which render it useful for the purposes of relaxing cramps of all kinds, especially in those forms which affect females, as in hysteria or during pregnancy or childbirth. It is said to prevent puerperal convulsions if used for the last month or two of pregnancy. Externally it may be used as an ingredient of poultices for indolent and malignant ulcers.

Used only in the form of fluid extract.

VIBURNI OPULI EXTRACTUM FLUIDUM.

FLUID EXTRACT OF VIBURNUM OPULUS.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 60 powder.

As a *menstruum* use alcohol and water mixed in the proportion of two hundred grams (about 8⅓ fluidounces) alcohol to every one hundred grams (about 3⅓ fluidounces) of water.

Dose.—Five to ten cubic centimeters (1 to 1½ fluidrachm).

Vina.

WINES.

Wines are prepared by the fermentation of the juice of grapes or of other fruits.

The varieties of the grape are countless, and each variety yields a wine differing more or less from the wines obtained from other grapes. The expressed juice of the grape, when containing from ten to twenty-five per cent. of sugar, will yield a good wine. When the fermentation has proceeded until fourteen per cent. alcohol are contained in the wine the process ceases. Hence wines can never contain above fourteen per cent. alcohol except by strengthening the natural wine by the addition of alcohol after the fermentation has ceased.

After the first fermentation is over the new wine is put into casks and allowed to rest a greater or less period. An after-fermentation then sets in, during which tartar deposits, the wine becomes clear, and ethers are formed, which give the wine its proper flavor ("bouquet").

Wines contain water, alcohol, sugar, tannin, fruit acids, and ethers. These should be in proper relative proportions in order to make the wine good.

Spanish, Portuguese, and certain other wines are strongly alcoholic, containing from sixteen to twenty or more per cent. of alcohol (sherry, port, madeira, etc.).

"Dry wines" are those in which nearly all the sugar has undergone vinous fermentation, so that they contain much alcohol, little sugar, and not much fruit acid.

"Sweet wines" are wines in which the fermentation has been arrested before all the glucose has been converted, and which thus contain an excess of sugar and enough alcohol to prevent further fermentation.

Dry sherry is a wine with but little sugar, and differs from sweet sherry only in that particular. Dry Catawba is a weak and acid wine, which readily undergoes acetous fermentation, but sweet Catawba contains a large quantity of sugar, and is not acid.

Astringent light wines, or claret wines, contain from ten to fourteen per cent. alcohol and much tannin (St. Julien, Medoc, etc.).

Sour wines, or Rhine wines, contain from eight to ten per cent. alcohol and a considerable quantity of fruit acids (Hochheimer, Liebfrauenmilch, Sauterne, etc.).

The oldest and best-known wines are, of course, European wines. German, French, Spanish, Italian, Greek, Hungarian wines, all differ essentially in flavor and other properties. In America wine-culture is still in its infancy, but enough has been done to show that American wines will in the near future be made of excellent quality. The greatest drawback to success in the past seems to have been that American wine-makers have attempted only to imitate celebrated foreign wines, and we have heard more of California "Sherry," Brocton "Port," etc., than of new and distinct American wines. It would seem to be a waste of time to attempt to make sherry, or port, or tokay, or any other distinct kind of wine in any other country than its original home. At least, no such attempt has ever been successful, although the efforts to naturalize the wines of one country in another have been numerous.

The only proper way would seem to be to cultivate the fruit to the greatest possible perfection, of whatever variety it may be, and to make as good a wine as possible from the fruit without reference to whether the product is or is not like any other wine.

The sherry and port wines were the only wines official in the Pharmacopœia of 1870, and these generally contain about twenty per cent. alcohol. As real sherry wine and real port wine are probably not imported into the United States at all, it is only the imitations of sherry

and port which have been used. These imitations may, however, be very excellent wines, and in speaking of "good sherry," or "fine sherry," a good wine resembling sherry is meant, and not the genuine.

The new Pharmacopœia, recognizing these facts, prescribes simply good wine from grape juice, having the properties laid down in the official description, without reference to any particular brand. This admits of the use of good American wines, of which many will be found to come up to the pharmacopœial standard. We believe, however, that the alcoholic strength, as fixed by the Pharmacopœia, is too low. Instead of from ten to twelve per cent. it should have been placed at from twelve to fourteen per cent., which would be more nearly in accordance with the actual strength of our best domestic wines.

The official directions for ascertaining the alcoholic strength of wines (see the Pharmacopœia, pages 374, 375, under title Vinum Album, and page 379 under title Vinum Rubrum) are incorrect. The quotient obtained by dividing the first weight by the second does not give the percentage of alcohol, but only gives approximately correctly the weight of the alcohol and water in the wine. Thus, if the "definite volume" operated upon be one hundred cubic centimeters, then the quotient obtained will express the specific gravity of a mixture of the alcohol contained in the wine, with enough water to make one hundred cubic centimeters, and by reference to the alcoholometrical table the percentage of alcohol will be found opposite that specific gravity.

Mulder's process, which is practically the one referred to in the Pharmacopœia, is as follows: Measure off one hundred cubic centimeters of the wine at a temperature of 15.6° C. (60° F.), and weigh it at that temperature; evaporate it until about one-third by volume remains, being careful not to let it boil, in order to avoid loss. The object of this evaporation is to expel all the alcohol. Then add enough distilled water to make the whole again measure one hundred cubic centimeters at the same temperature as before. The alcohol contained in the wine has now been replaced by an equal volume of water. Now again weigh the liquid. Deduct the weight of one hundred cubic centimeters of water (0.999 gram) from the weight of the liquid last obtained. The remainder represents the weight of solid matter in the wine. This weight of the solid matter deducted from the first weight (of the original wine), expressed in grams, will give the specific gravity of a liquid composed of all the alcohol and water, minus the solid matter, in the wine, or the specific gravity of the wine after the removal from it of the solid substances, and having obtained this specific gravity the percentage of alcohol is seen by reference to the alcoholometrical table.

Vinum Album; U. S.

White Wine.

Description and Tests.—See the Pharmacopœia, page 374.

By white wine is meant any dry white wine made from pure grape juice and having the general properties described in the Pharmacopœia. It must neither be too acid nor too sweet, should be clear and free from yeastiness, and must contain not less than ten nor more than twelve per cent. alcohol. Catawbas, Rhine wines, and sherries are excluded by this description, being either too sweet, too acid, or too alcoholic. Dry Catawba does not keep well enough. Dry Scuppernong is within the requirements of the Pharmacopœia.

As the only pharmacopœial use of white wine is for making the stronger white wine, we fail to appreciate the utility of the limitation as to alcoholic strength. Surely white wine of better quality as a wine, containing more than twelve per cent. alcohol, will be preferred for therapeutic use, *per se*.

Medicinal Uses.—White wine is often given for its effects as an alcoholic stimulant. It is somewhat more prompt and active than a mixture of water and alcohol of the same percentage strength of alcohol, on account of the ethers and volatile oils which it contains, but it is generally preferred merely on account of its being a more pleasant drink.

It is, of course, impossible to state any dose, as the amount to be taken depends on previous habits and present condition of the patient, as well as upon the nature of the wine that is used.

VINUM ALBUM FORTIUS; U. S.

Stronger White Wine.

Mix seven hundred grams (about 24 fluidounces) white wine and one hundred grams (about 4 fluidounces) alcohol.

The white wine used must be one containing not less than ten nor more than twelve per cent. alcohol, and must answer the description given in the paragraph under the title Vinum Album. The resulting mixture will then have a strength of not less than twenty nor more than twenty-five per cent. alcohol.

A better way is to use good sherry containing about twenty per cent. alcohol, or to strengthen a weaker sherry until it contains about twenty-two per cent. alcohol.

The object of having a wine of this alcoholic strength is to render it a more fit pharmaceutical menstruum. To be a good menstruum it

must be of approximately uniform alcoholic strength, and at the same time sufficiently strong to be a good solvent. But medicated wines are at best but inferior tinctures. A preparation made with alcohol and water in fixed proportions must be more uniform than the corresponding wine, and there is nothing in the wine which makes it preferable to the tincture. Wine is used because it is a pleasant alcoholic stimulant, and to make the official medicated wines from it is to make poor tinctures and at the same time to spoil good wine. In the extremely few instances where the tartaric acid in the wine is of any practical value as a chemical solvent, it would seem to be better to add the requisite quantity of tartaric acid to the menstruum than to rely upon the uncertain quantity of acid contained in the wine.

Vinum Rubrum.

RED WINE.

Burgundy, Norton's Virginia Seedling, and Clinton are red wines coming within the requirements of the Pharmacopœia. Clarets are too weak in alcohol.

VINI SYRUPUS.

SYRUP OF WINE.

Dissolve six hundred grams (21 ounces) sugar in four hundred cubic centimeters (13½ fluidounces) Concord wine, by the cold process.

This yields a very pleasant tasting syrup, which may be used for the same purposes as fruit syrups.

A syrup made in the same manner from Virginia Seedling wine furnishes a syrup which is a useful addition to diarrhœa mixtures, etc.

Viola Tricolor; U. S.

VIOLA TRICOLOR.

Wild Pansy.

Origin.— *Viola tricolor*, Linné (*Violaceæ*).

Habitat.—Northern temperate zone.

Part used.—The whole flowering plant.

Description.—See the Pharmacopœia, page 379.

Constituents.—Supposed to contain a little *violin*, the emetico-cathartic principle found in *Viola odorata*.

Medicinal Uses.—Has been recommended as a remedy in eczema

and other skin diseases. Not often used nor of much value. It is given internally or applied externally as an ingredient of poultices.

Dose.—One to five grams (15 to 75 grains); best given in the form of infusion.

VIOLÆ SYRUPUS.

SYRUP OF VIOLA TRICOLOR.

Infuse five hundred grams (17 ounces) fresh violet flowers in one liter (34 fluidounces) hot water for two hours; express the infusion, let it stand an hour or two to settle; filter, and dissolve two thousand grams (70 ounces) of sugar in the filtrate.

The preparation is a pale, violet-colored, agreeably fragrant syrup.

Vitellus; U. S.

YOLK OF EGG.

Ei-dotter, G.; *Jaune d'œuf*, F.; *Ägg-gula*, Sw.; *Yelk of Egg.*

Description.—See the Pharmacopœia, page 379. See also article "Ovum."

VITELLI GLYCERITUM; U. S.

GLYCERITE OF YOLK OF EGG.

Glyconin.

Triturate forty-five grams (1 ounce 260 grains) fresh yolk of egg in a mortar with fifty-five grams (1 ounce 400 grains) glycerin gradually added, until intimately mixed.

The above quantity of glycerite of yolk of egg (100 grams) will be sufficient to emulsify thoroughly from three hundred grams to four hundred grams (10 to 13 fluidounces) of fixed oil. This is the only use to which this preparation is applied.. It is new to the Pharmacopœia.

Wintera.

WINTERA.

Winteræ Cortex—Winter's Bark.

Origin.—*Drimys Winteri*, Forster (*Magnoliaceæ*).

Habitat.—South America.

Part used.—The inner bark.

Description.—Troughs, or rarely quills, about two to eight millimeters ($\frac{1}{12}$ to $\frac{1}{3}$ inch) in thickness, two to four centimeters ($\frac{4}{5}$ to $1\frac{3}{5}$ inch)

broad, and of irregular lengths. Externally grayish or rust-brown, inner surface brown, striated or ridged ; fracture short, coarsely granular, brownish, with whitish and yellowish dots (indicating stone cells and resin cells); odor aromatic ; taste pungent, somewhat astringent.

Constituents.—Volatile oil, soft pungent resin, tannin, etc.

Used like canella.

Dose.—Two to five grams (30 to 75 grains), best given as FLUID EXTRACT made with alcohol as a menstruum.

Xanthoxylum ; U. S.

XANTHOXYLUM.

Xanthoxyli Cortex—Prickly Ash Bark.

Origin.—*Xanthoxylum fraxineum*, Willdenow, and *Xanthoxylum carolinianum*, Lambert (*Rutaceæ*).

Habitat.—The United States.

Part used.—The bark.

Description.—See the Pharmacopœia, page 379.

Constituents.—An acrid green oil, acrid soft resin, a bitter alkaloid or other principle, tannin, etc.

Medicinal Uses.—Xanthoxylum is employed as a nervous and arterial stimulant, sialagogue, diaphoretic, and alterative. It is sometimes useful in *flatulent colic, suppression of menses, chronic hepatic troubles, chronic rheumatism, syphilis*, etc.

Externally it is an acrid stimulant and is applied as a counter-irritant or revulsive.

Dose.—0.5 to 2 grams (8 to 30 grains).

XANTHOXYLI [CORTICIS] EXTRACTUM FLUIDUM; U. S.

FLUID EXTRACT OF XANTHOXYLUM [BARK].

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and twenty-five grams (about 5 fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey and then dissolve it in the *first percolate.* Add enough of the menstruum to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.5 to 2 cubic centimeters (8 to 30 minims).

Xanthoxyli Fructus.

XANTHOXYLUM FRUIT.

Prickly Ash Berries.

Origin.—See Xanthoxylum.

Description.—Pods oval, thick, and fleshy, greenish or red, two-valved, usually open, one- or two-seeded ; seeds oval, black, shining. Odor aromatic ; taste pungent, aromatic.

Constituents.—Volatile oil and resin.

Medicinal Use.—Action similar to that of the bark. The berries are supposed to exert a beneficial effect on the mucous membranes in affections of the bowels, as in *diarrhœa, cholera morbus, flatulence,* etc.

Dose.—0.5 to 2 grams (8 to 30 grains), best given in the form of FLUID EXTRACT made with alcohol as a menstruum.

Zedoaria.

ZEDOARY.

Zedoariæ Rhizoma.

Origin.—*Curcuma Zedoaria,* Roscoe (*Zingiberaceæ*).

Habitat.—India.

Part used.—The rhizome.

Description.—Transverse slices, or disks, one to four centimeters ($\frac{2}{5}$ to $1\frac{3}{5}$ inch) in diameter, externally orange-brown, interiorly reddish-brown, with numerous brownish-yellow resin cells ; fracture mealy ; odor and taste pungent, aromatic, reminding of ginger.

Constituents.—Volatile oil and resin.

Medicinal Uses.—Similar to those of ginger.

Dose.—One to two grams (15 to 30 grains).

Zincum.

ZINC.

Description.—See the Pharmacopœia, page 384.

The zinc salts are white. Chloride, iodide, sulphate, acetate, valerianate, and sulpho-carbolate are soluble in water. Carbonate is insoluble ; also phosphide and cyanide.

Zinci Acetas; U. S.

ACETATE OF ZINC.

Zincicus Acetas—Zinc Acetate.

Description and Tests.—See the Pharmacopœia, page 380.

Medicinal Uses.—Has been given internally in *epilepsy* and other nervous diseases, but is rarely employed for that purpose at present.

In large doses it is emetic.

It is used chiefly as an astringent in solution, *gonorrhœa*, *gleet*, etc.

Dose.—As a nervine, 0.03 to 0.1 gram ($\frac{1}{2}$ to 2 grains); as an emetic, 0.5 to 2 grams (8 to 30 grains).

Zinci Bromidum; U. S.

BROMIDE OF ZINC.

Zincicum Bromidum—Zinc Bromide.

Description and Tests.—See the Pharmacopœia, page 380.

Medicinal Uses.—Supposed by some to combine the nervine effects of zinc with those of bromine. Rarely used.

Dose.—0.06 to 0.3 gram (1 to 5 grains).

Zinci Carbonas Præcipitatus; U. S.

PRECIPITATED CARBONATE OF ZINC.

Zincicus Carbonas—Zinc Carbonate.

Description and Tests.—See the Pharmacopœia, page 381.

Medicinal Uses.—Its employment internally as a nervine is obsolete. It is now used externally in powder or ointment as an application to *excoriations*, *eczema*, etc.

Dose.—0.06 to 0.2 gram (1 to 3 grains).

ZINCI CARBONATIS CERATUM; PHAR. 1870.

CERATE OF CARBONATE OF ZINC.

This preparation is, properly speaking, not a cerate but an ointment, and will be found under the title Zinci Carbonatis Unguentum.

ZINCI CARBONATIS UNGUENTUM.

OINTMENT OF CARBONATE OF ZINC.

Cerate of Carbonate of Zinc, Phar. 1870.

Mix thirty grams (1 ounce) precipitated carbonate of zinc and one hundred and fifty grams (5 ounces) simple ointment.

Zinci Chloridum; U. S.

CHLORIDE OF ZINC.

Zincicum Chloridum—Zinc Chloride.

Description and Tests.—See the Pharmacopœia, page 381.

Uses.—Not employed internally. Externally it is a powerful escharotic used to destroy *syphilitic* and *cancerous growths.* Its application is very painful, and the use of a knife is much to be preferred. The solution is antiseptic.

ZINCI CHLORIDI LIQUOR; U. S.

SOLUTION OF CHLORIDE OF ZINC.

Zincici Chloridi Solutio—Solution of Zinc Chloride.

Put two hundred and forty grams (8 ounces 200 grains) granulated zinc into a jar and add gradually enough hydrochloric acid to dissolve it, which will require from seven hundred and fifty to one thousand grams (26 to 35 ounces). The solution is strained, twelve grams (185 grains) nitric acid is added, the liquid is then evaporated to dryness, and the dry mass fused, allowed to cool again, and then dissolved in one hundred and fifty grams (5 fluidounces) distilled water. Now add twelve grams (185 grains) precipitated carbonate of zinc, and shake the mixture occasionally during twenty-four hours. Then filter the liquid either through white filtering paper free from iron (to prevent its becoming colored) or through loose clean cotton, and pass enough distilled water through the same filter or cotton to make the whole product weigh one thousand grams (35 ounces 120 grains).

The object of shaking the solution with precipitated carbonate of zinc is to remove iron in the form of ferric oxide.

Description.—Clear, colorless, odorless, astringent, sweetish, metallic, acrid; reaction acid. Specific gravity 1.555, corresponding to 52° Baumé. It contains fifty per cent. zinc chloride.

Uses.—Sometimes employed as a disinfectant in closets, sinks, drains, sewers, etc.

Zinci Iodidum; U. S.

IODIDE OF ZINC.

Zincicum Iodidum—Zinc Iodide.

Description and Tests.—See the Pharmacopœia, page 382.

Medicinal Uses.—Has been used internally as a nervine tonic. Sometimes employed externally in ointment in *chronic skin diseases.*

Dose.—0.06 to 0.2 gram (1 to 3 grains).

Zinci Lactas.

LACTATE OF ZINC.

Zincicus Lactas—Zinc Lactate.

Description.—A white salt, crystallizing in plates, soluble in sixty parts cold and in six parts of boiling water; inodorous, of a very sweet taste, with a metallic after-taste.

Uses.—Nervine tonic in *epilepsy* and *chorea.*

Dose.—0.002 to 0.06 gram ($\frac{1}{3}$ to 1 grain).

Zinci Oleatum.

OLEATE OF ZINC.

Dissolve five grams (77 grains) oxide of zinc in ninety-five grams (3 ounces 150 grains) oleic acid by trituration.

It is a soft, homogeneous ointment.

Uses.—For local application in some skin diseases.

Zinci Oxidum; U. S.

OXIDE OF ZINC.

Zincicum Oxidum—Zinc Oxide.

Description and Tests.—See the Pharmacopœia, page 382. Must be a soft, impalpable powder.

Medicinal Uses.—Occasionally used internally as a nervine tonic in *chronic nervous disorders.* Has also found favor with some as a remedy in *gastralgia, night-sweats,* and *diarrhœa.* Also used externally in powder or ointment in *excoriations, eczema,* etc.

Dose.—0.06 to 0.3 gram (1 to 5 grains).

ZINCI OXIDI UNGUENTUM; U. S.

OINTMENT OF OXIDE OF ZINC.

Mix one hundred grams (3 ounces 230 grains) oxide of zinc and four hundred grams (14 ounces) benzoinated lard.

In hot weather this ointment will melt and run. Should always be kept in a cool place. Benzoinated cerate mixed with one-half its weight of benzoinated lard should be used instead of benzoinated lard alone.

Zinci Phosphidum; U. S.

PHOSPHIDE OF ZINC.

Zincicum Phosphidum—Zinc Phosphide.

Description and Tests.—See the Pharmacopœia, page 382.

Uses.—Given for the same purposes as phosphorus in

Doses of 0.005 to 0.02 gram ($\frac{1}{12}$ to $\frac{1}{3}$ grain).

Zinci Sulphas; U. S.

SULPHATE OF ZINC.

Zincicus Sulphas—Zinc Sulphate.

Description and Tests.—See the Pharmacopœia, page 383.

Medicinal Uses.—Rarely employed as a nervine tonic. In large doses it is one of the promptest emetics, and its use as such is especially indicated in cases of poisoning.

In solution it is often used as an astringent *eye-wash* or *injection.*

Dose.—As a nervine, 0.03 to 0.06 gram ($\frac{1}{2}$ to 1 grain); as an emetic, about two grams (30 grains), in solution.

Zinci Sulphocarbolas.

SULPHOCARBOLATE OF ZINC.

White crystals of a faint carbolic acid odor.

Used externally in ointment as a disinfectant and antiseptic dressing for *wounds* and *foul ulcers.*

ZINCI SULPHOCARBOLATIS UNGUENTUM.

OINTMENT OF SULPHOCARBOLATE OF ZINC.

Mix fifteen grams ($\frac{1}{2}$ ounce) zinc sulphocarbolate with one hundred and thirty-five grams ($4\frac{1}{2}$ ounces) petroleum ointment, triturating until perfectly uniform.

Zinci Valerianas; U. S.

VALERIANATE OF ZINC.

Zincicus Valerianas—Zinc Valerianate.

Description and Tests.—See the Pharmacopœia, page 383.

Used in some forms of nervous diseases, *hysteria, neuralgia, chorea,* etc.

Dose.—0.03 to 0.3 gram ($\frac{1}{2}$ to 5 grains).

Zingiber ; U. S.

GINGER.

Zingiberis Rhizoma—Ingwer, G.; *Gingembre*, F.; *Gengibre*, Sp.; *Ingefära*, Sw.

Origin.—*Zingiber officinale*, Roscoe (*Zingiberaceæ*).

Habitat.—Cultivated in tropical countries.

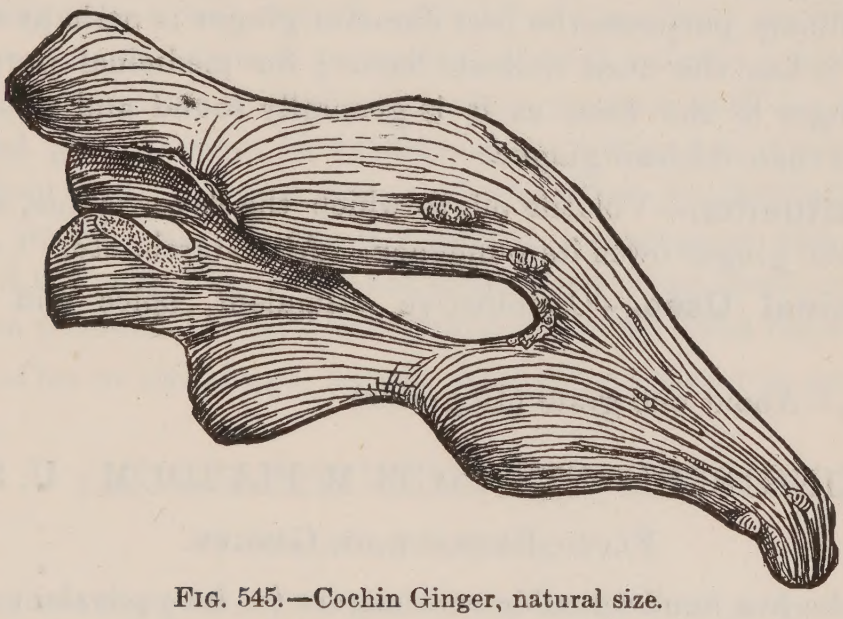
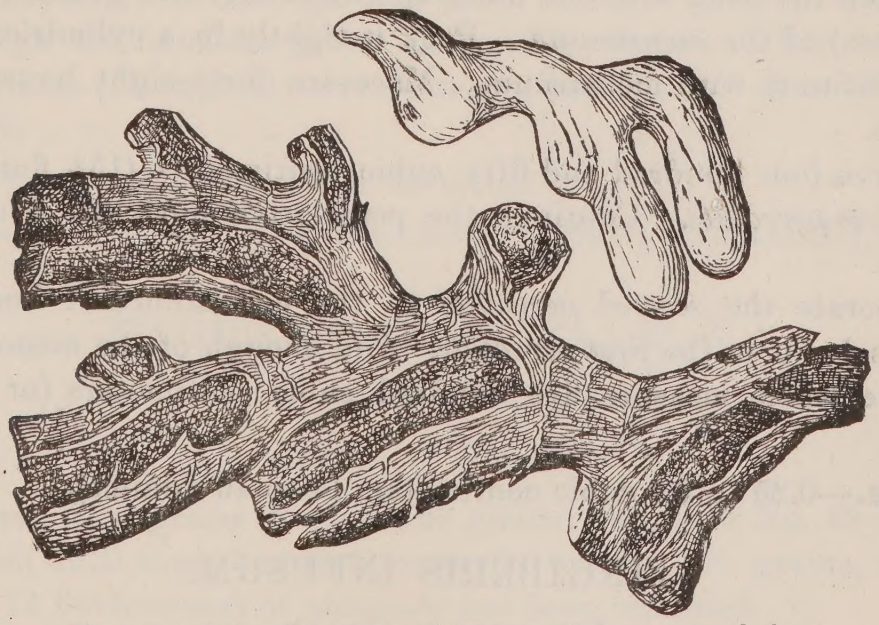


FIG. 545.—Cochin Ginger, natural size.

Part used.—The rhizome.

Description.—See the Pharmacopœia, page 384. Cochin ginger best answers the pharmacopœial description.



FIGS. 546, 547.—Jamaica and African Ginger, natural size.

Varieties.—*Jamaica ginger* is whitish externally and internally, and covered with a white coat of lime. Has long lobes.

Cochin ginger is buff or pale yellow, with short lobes.

African ginger is brownish-gray, with flattened short lobes.

East India ginger has the epidermis removed on the flat sides.

Coated ginger is the rhizome with the epidermis remaining. *Uncoated ginger* is peeled and therefore paler. *Bleached* ginger has been treated with chlorinated lime, and is whiter than the *natural* or *unbleached* ginger.

For culinary purposes the best Jamaica ginger is perhaps to be preferred, as it has the most delicate flavor; for medicinal purposes the Cochin ginger is the best, as it is generally sound and pungent, but less coarse than African ginger.

Constituents.—Volatile oil, to which the flavor is due, and resin, to which the ginger owes its pungency. Also starch, etc.

Medicinal Uses.—Carminative stimulant, spice and flavoring agent.

Dose.—About one gram (15 grains).

ZINGIBERIS EXTRACTUM FLUIDUM; U. S.

Fluid Extract of Ginger.

To make five hundred cubic centimeters (or its equivalent—17 U. S. fluidounces), use five hundred grams (or its equivalent—17⅔ avoirdupois ounces) of the drug, in No. 30 powder.

As a *menstruum* use alcohol.

Moisten the drug with one hundred and twenty-five grams (about 5⅓ fluidounces) of the *menstruum*. Pack it tightly in a cylindrical percolator. Saturate with menstruum. Macerate forty-eight hours. Then percolate.

Reserve four hundred and fifty cubic centimeters (15¼ fluidounces) of the *first percolate*. Continue the percolation until the drug is exhausted.

Evaporate the *second percolate* to the consistence of honey, and then dissolve it in the *first percolate*. Add enough of the *menstruum* to make the whole measure five hundred cubic centimeters (or 17 fluidounces).

Dose.—0.25 to 2.5 cubic centimeters (4 to 40 minims).

ZINGIBERIS INFUSUM.

Infusion of Ginger.

From ten grams (about ⅓ avoirdupois ounce) of the drug make five hundred grams (equal to about 17 U. S. fluidounces).

Dose.—Twenty-five to seventy-five cubic centimeters (6 to 18 fluidrachms).

ZINGIBERIS OLEORESINA; U. S.

OLEORESIN OF GINGER.

Pack one thousand grams (35 ounces 120 grains) ginger, in No. 60 powder, firmly into a tall, narrow cylindrical percolator provided with cover and receptacle adapted to operations with volatile menstrua (see page 721), and percolate it slowly with stronger ether until one thousand five hundred grams (about 68 fluidounces) percolate has slowly passed. Recover about one thousand grams of the ether by distillation on a water-bath, put the residue into a porcelain evaporating dish and expose it until the remaining ether has evaporated away spontaneously.

Keep the product in small, well-corked, wide-mouthed bottles.

Dose.—One or two drops, largely diluted with water or syrup.

ZINGIBERIS SYRUPUS; U. S.

SYRUP OF GINGER.

Triturate twenty grams (300 grains) fluid extract of ginger with two hundred and fifty grams (8 ounces 360 grains) sugar; heat the mixture at 60° C. (140° F.) until all the alcohol has evaporated. Then mix the residue with three hundred and fifty grams (12 fluidounces) water, filter the solution, and add through the filter enough water to make the whole weigh six hundred grams (about 21 ounces). Then add four hundred grams (14 ounces) more of sugar, and dissolve it without the aid of heat.

Used as a carminative or for flavoring.

Dose.—Five to ten cubic centimeters (1 to 2½ fluidrachms).

ZINGIBERIS TINCTURA; U. S.

TINCTURE OF GINGER.

Essence of Ginger.

Percolate sixty grams (2 ounces 50 grains) ginger, in No. 40 powder, with alcohol until three hundred grams (10 ounces 250 grains, measuring about 12 fluidounces) of percolate has been obtained.

This tincture is one-third weaker than the preparation of the old pharmacopœia (1870).

Dose.—Two to five cubic centimeters (30 to 75 minims).

ZINGIBERIS TROCHISCI; U. S.

Ginger Troches.

Mix thirteen grams (200 grains) tincture of ginger with one hundred and thirty grams (2,000 grains) sugar; dry the mixture well, and reduce it to powder; then add 3.25 grams (50 grains) powdered tragacanth, and finally enough syrup of ginger to make a proper mass. Divide it into one hundred troches.

Dose.—One every few hours as a carminative.

THE MICROSCOPE IN PHARMACOGNOSY.

THE importance of the microscope in the study of pharmacognosy is well understood. While we may be able without this instrument to distinguish one crude drug from another while in the whole state, it is usually difficult, if not impossible, to distinguish them or to determine the degree of purity when in the form of powder. Drugs may often resemble each other externally, when the examination of their internal structure reveals marked differences.

A short account of the necessary apparatus and manipulations enabling the reader to use the microscope for the examination of drugs may therefore add to the usefulness of this book. The most practical methods of making permanent preparations will also be described, so that a cabinet of mounted slides may be made for future reference.

A few words on the construction of the microscope may prove of interest.

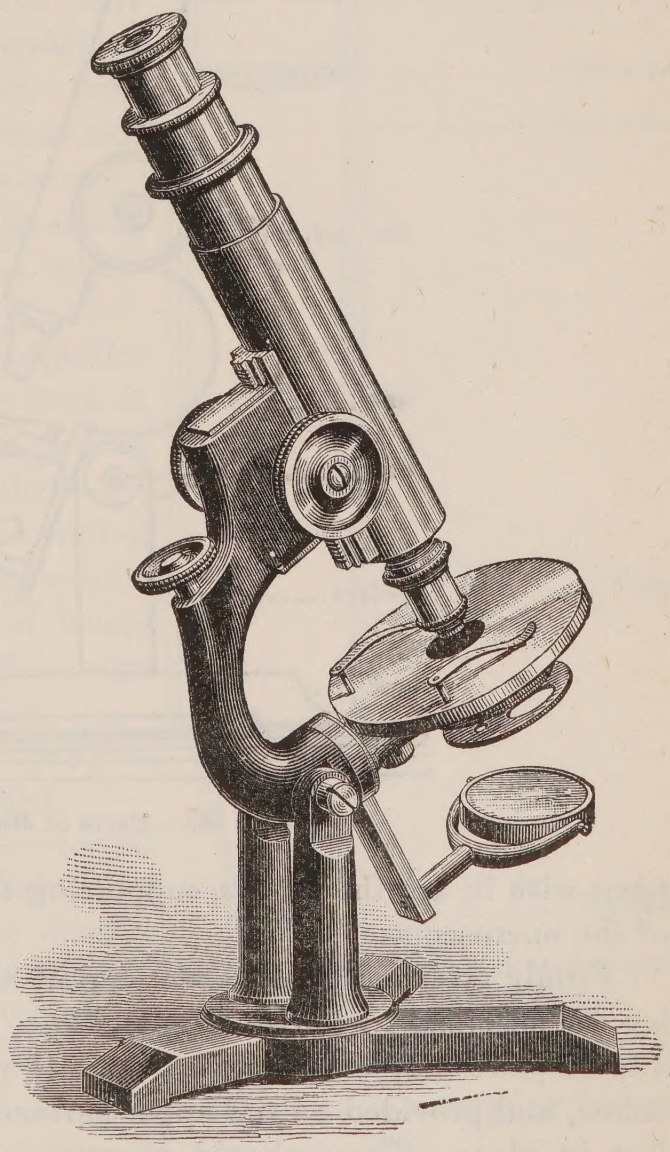


FIG. 548.—Compound Microscope.

In Fig. 548 is represented a *compound* microscope, so called to distinguish it from the *simple* microscope, or single magnifying lens, because it possesses a combination of lenses. The compound microscope consists of the mechanical and optical parts, the first being the *stand*, the other the *lenses*.

The stand should be made to incline, as in the illustration. Its different parts are shown and their designations given in Fig. 549.

By referring to this illustration, the *stand* is seen to have a *base* or *foot*, which should be preferably of the form known as the *tripod base* and sufficiently heavy to insure a firm position of the instrument at whatever angle it may be placed. Upon the base, and often in one

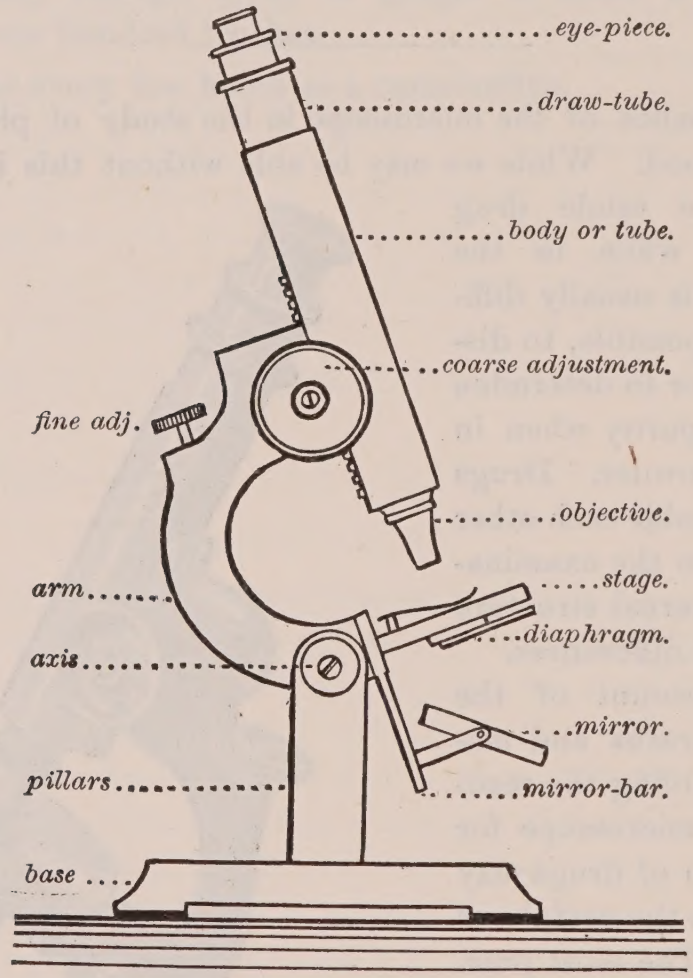


FIG. 549.—Parts of Microscope.

piece with it, are the *pillars*, supporting the *axis*, which carries the *arm* of the microscope.

Firmly attached to the lower end of the arm is a *stage*, on which to lay the specimens we wish to examine. The simplest form of stage is a brass plate perforated in the centre to permit the light to pass from below, and provided on the upper surface with clamps to hold the object in place. These should be removable, and the stage should be provided further with a *diaphragm* beneath it, which will allow us to diminish the amount of transmitted light or shut it out entirely.

A *mirror-bar* is attached to the arm, carrying the *mirror*, which latter should be plane on one side and concave on the other. If the

mirror-bar can be made to swing on its axis, so as to bring the mirror above the stage for the illumination of opaque objects, it will be found to be a great convenience.

Attached to the upper part of the arm is the *body* or *tube*, which can be moved up or down by sliding in a tube, or preferably, by means of a *coarse adjustment* or rack-and-pinion movement. This is for the purpose of adjusting the focus. With higher powers the *fine adjustment* is convenient, because it allows of very delicate movement of the tube.

The body has sliding within it (telescoping) another tube, which may be drawn out so as to lengthen the body and thereby increase the magnifying power. This is the *draw-tube*. Both tubes are blackened on the inner surface.

These parts together are the *stand*, or the mechanical part of the microscope.

The optical parts are the *objective* and *eye-piece*, or *ocular*, the first of which is the magnifying lens, and is attached to the lower end of the body, while the other is a small tube sliding into the upper part of the draw-tube and carrying a combination of lenses for enlarging or *amplifying* the image made by the objective.

The relation of the optical parts to each other are shown in Fig. 550.

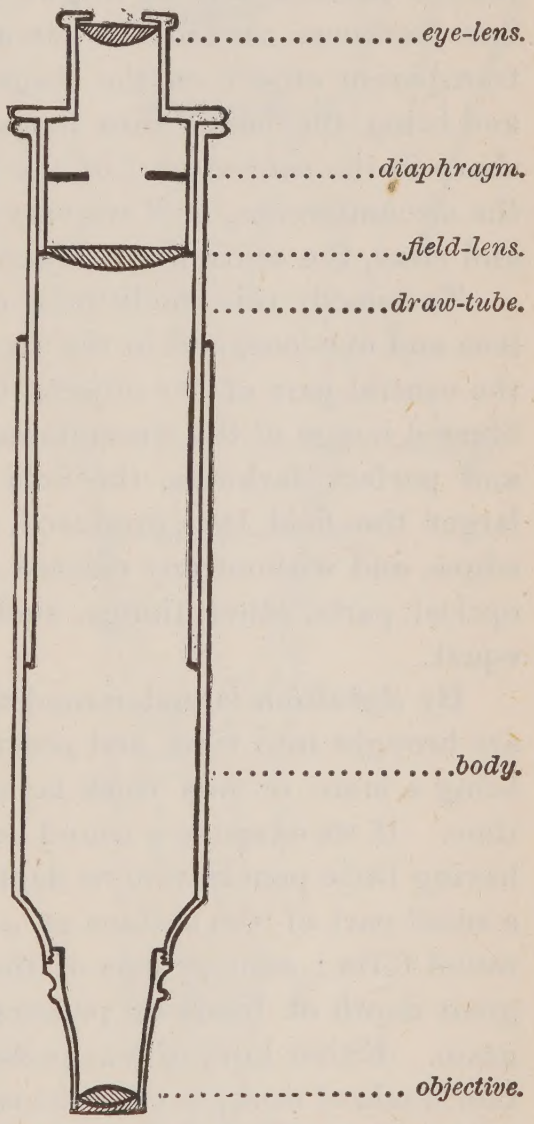


FIG. 550.—Construction of Optical part of Compound Microscope.

The objective should be corrected for chromatic and spherical aberration, which is done by combining a double-convex lens of crown-glass and a plano-concave lens of flint-glass (*doublet*). In the better class of objectives the correction is obtained by a combination of three lenses (*triplet*), and often one objective contains several triplets and doublets combined, so as to act as one lens.

Objectives are designated by their focal distance, thus: "1 inch," "$\frac{1}{4}$ inch," etc. This is the distance at which a single lens with the same magnifying power would have to be placed from the object to form the distinct image, but the actual distance of the front lens of the

combination from the object is much less when in focus. The magnifying power increases as the focal distance decreases.

The eye-piece has two lenses, the lower and larger being called the *field-lens*, the upper, which is next to the eye, being the *eye-lens*.

By looking into a microscope provided with the above parts we perceive an illuminated surface when the light is reflected upward through the objective. This illuminated disk is called the *field*. But while the central portion will be bright, the edges are dim and gradually fade into darkness toward the circumference. If we place a large, flat, transparent object on the stage, reflect the light upward through it, and bring the lenses into focus, we see the enlarged image clear and sharp in the central part of the field, but diffuse and indistinct toward the circumference, or if we vary the focus to bring the edges out sharp and clear, the central part becomes confused and blurred.

To remedy this condition a *diaphragm* is placed between the field-lens and eye-lens, and in the focus of the latter. If we now focus on the central part of the object, the diaphragm shuts out from view the blurred image of the circumference, and the field is bounded by abrupt and perfect darkness, the field appearing brighter by contrast. The larger the field thus produced, without blurring of the image at the edges, and without any colored rings around the edges, the better the optical parts, other things, such as definition and penetration, being equal.

By *definition* is understood the clearness with which minute details are brought into view, and *penetration* is the power of an objective to bring a more or less thick layer of the object into view at the same time. If we examine a round body, as a pollen-grain, with a high power having little penetration or depth of focus, we may only be able to see a small part of the surface at a time without giving us an idea of its round form ; another lens of the same magnifying power may possess great depth of focus or penetration and show the object as a round grain. Either kind of lens possesses advantages over the other for certain kinds of work, but for the use of the pharmacognocist the lens with a fair depth of focus is preferable to one with but little depth of focus.

The action of the different lenses is diagramatically explained in Figs. 551 and 552. The objective, *b*, gathers the rays of light proceeding from the object *a*, and brings them to a focus, producing the enlarged and inverted image *c*.

In the simplest form of compound microscope there are but two lenses, the objective and eye-lens (Fig. 551). The image *c*, which was formed by the objective, is viewed direct, without inversion, by the eye-lens. By following the course of the different rays of light, as in-

dicated by the dotted lines, it will be seen that the light is dispersed again after the image was formed, and but a small portion, and that only from the central part of the image, enters the eye-lens at all, while the remainder is lost. We therefore see only a small portion of the central part of the object, and that only dimly illuminated.

By interposing an additional lens (Fig. 552) the scattering rays of light are converged toward and through the eye-lens, and we are enabled to see more of the object, or what is the same thing, the field is enlarged and more brilliantly lighted. As this lens so materially improves the field it is called the field-lens.

As we see any object in the direction in which the rays of light from it enter our eye, we will see the image apparently as in *f* (Fig. 552); but as the image will appear to be larger or smaller in proportion as we imagine it to be nearer or further away, this image which we see is by common consent supposed to be ten inches from the eye, and larger microscopes are so made that this will bring the image into the same plane with the object; in other words, the distance from the object to the eye-lens is about ten inches. In smaller instruments the draw-tube may be drawn out and the standard length of tube obtained in that manner. This, however, is only necessary when we desire to make measurements. By drawing out the tube we may increase the rate of enlargement.

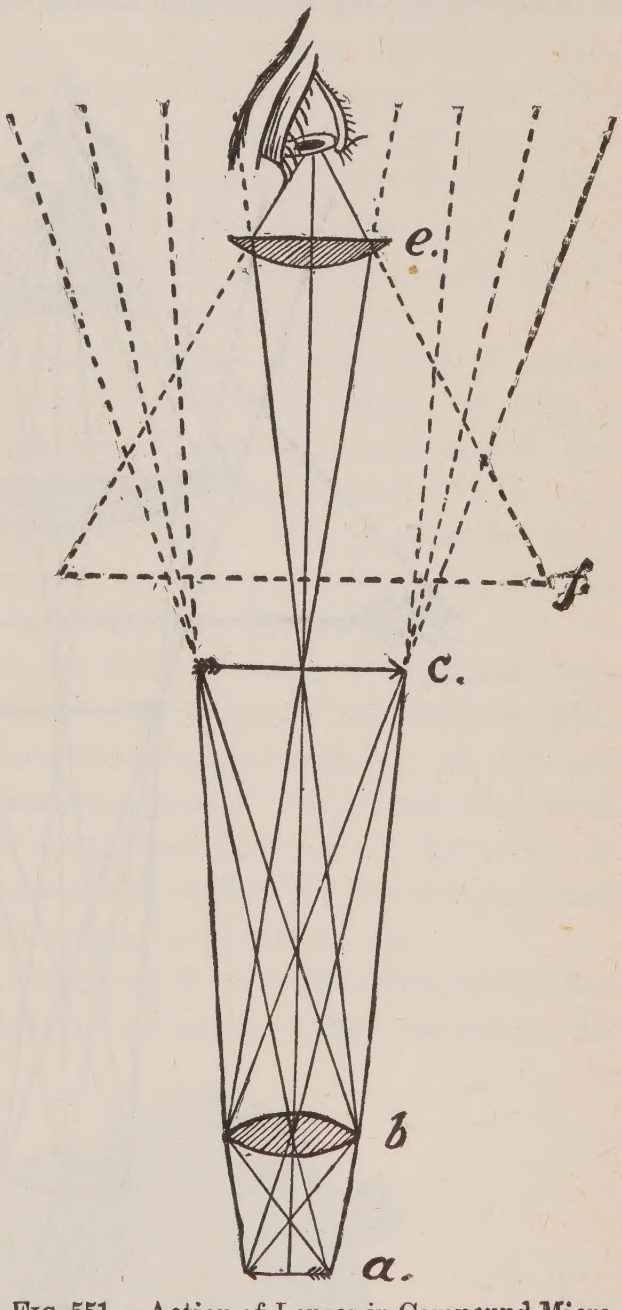


FIG. 551.—Action of Lenses in Compound Microscope, simplest form.

By using oculars of different magnifying powers we can obtain various degrees of enlargement (or *powers*) with the same objective, but it generally is better to obtain higher powers with higher objectives.

The power of an instrument, or rather of the combination of lenses at any time attached to the microscope, is expressed in diameters and not in areas. Thus, if an object which in reality is one-tenth of an inch square, appears to be five inches square when viewed with a microscope, it is enlarged fifty diameters, commonly expressed "fifty times," but as

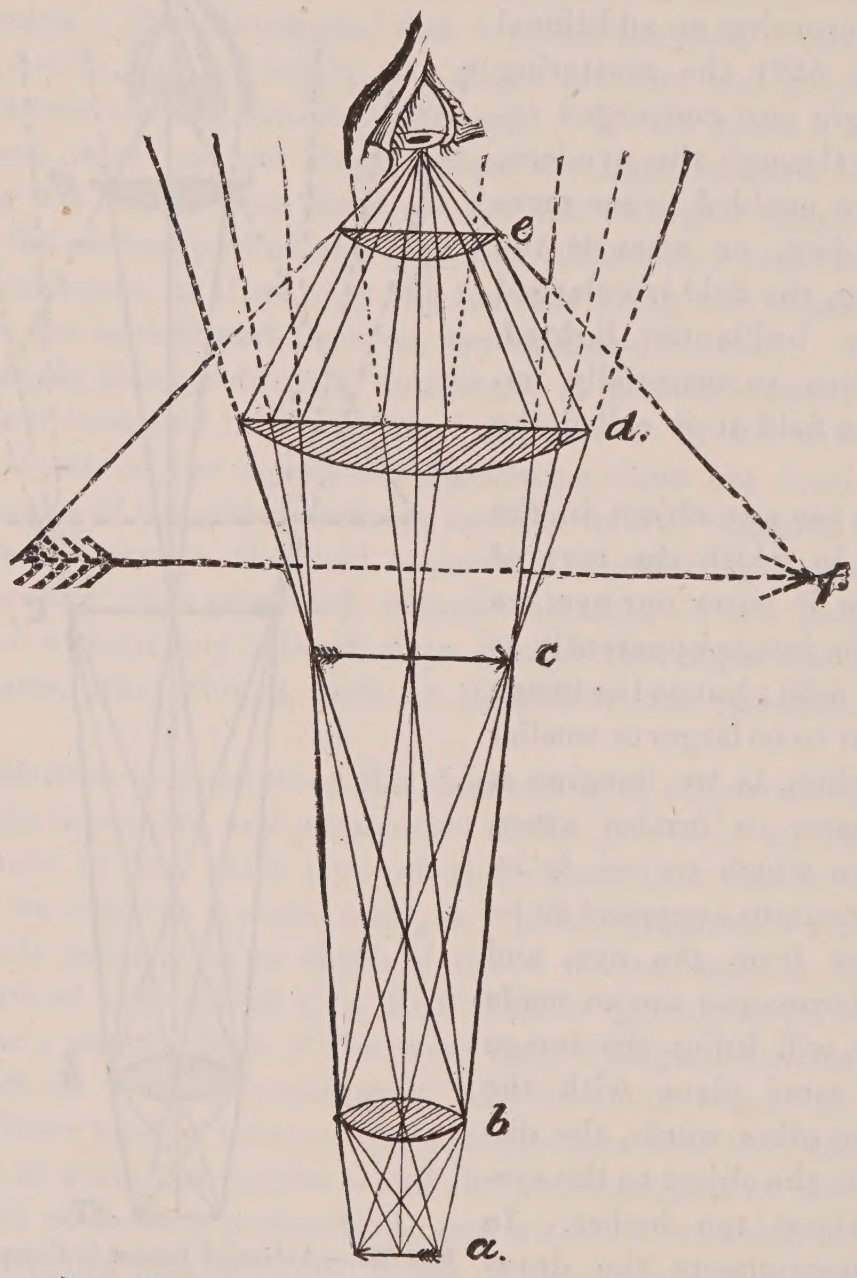


FIG. 552.—Action of Field-lens in Compound Microscope.

it is equally enlarged in all directions its area will appear to be 50×50, or 2,500 times as large as it really is. Dealers often state the surface enlargement when advertising cheap popular instruments, because a microscope magnifying "2,500 times" will sell more readily for a few dollars than another which magnifies "only fifty diameters."

In reality the rate of enlargement is still greater than expressed

above. A small object, as a pollen-grain, viewed with a magnifying power of fifty diameters appears enlarged equally in all of its dimensions, and therefore seems to be $50 \times 50 \times 50$, or 125,000 times as large as it really is.

It is well to remember that an excess of light is not always the best way of showing delicate structures, but that a dim light will often bring out details, totally invisible in a full flood of central light. The diaphragm under the stage enables us to moderate the light as necessary, and if we are so fortunate as to possess an instrument with a swinging mirror-bar, we can sometimes show delicate lines, as, for instance, in the starches, by removing the diaphragm entirely and allowing the light to reflect upward in a very oblique direction.

It is usually thought that an expensive array of apparatus is necessary for the study of the microscopical structure of drugs, but such is not really the case. The microscope is the most expensive part of the outfit; but when it is considered that a good instrument will serve a lifetime the first outlay will not appear so large. The pharmacist does not need as fine or large an instrument as the physician, because the structures to be examined are not as delicate or minute.

If a cheap microscope is desired, we know of none of the same price that equals Bausch & Lomb's "*Model Microscope*" (Fig. 548) for $45. This instrument is the best we have seen for the money, and will answer all the requirements of the pharmacognocist. It is furnished with two objectives, 1″ and $\frac{1}{4}$″, the first being well adapted for the study of whole sections, while the higher power will suffice for the study of the individual cells in powders, or for starches, lycopodium, etc.

Much time is usually lost in changing from one objective to the other, and we would, therefore, advise purchasers of this instrument to

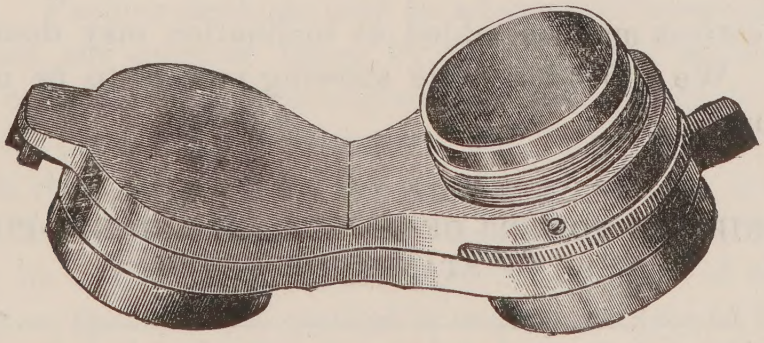


FIG. 553.—Nose-piece.

order it with a *nose-piece* (Fig. 553), which is attached to the lower part of the body and carries both objectives, so that one or the other may be brought into use without trouble or delay. If ordered with the instrument and lenses, the different parts will be so adjusted that both objec-

tives are properly centred, and either will be in focus at once without further adjustment, except perhaps with the fine adjustment. This convenient appliance will save many times its value ($6) in time, in the course of a year's study.

For an additional $5 this microscope can be furnished with an excellent mechanical stage (Fig. 554), consisting of a polished plate of glass, encased in a brass ring which clamps on the circular stage. The slide-carrier, which moves on it, consists of a light metallic plate, and has protruding from its lower surface four small points; at its two ends are prolongations bent downward and inward, which press against the lower surface of the glass, acting as springs. The contact between the stage and slide-carrier being only in these six points, the friction is very little, and the motion smooth and steady.

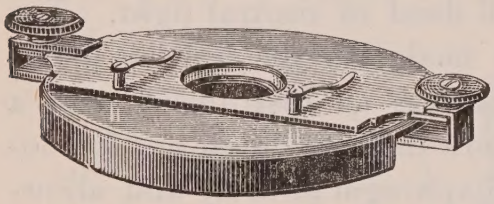


FIG. 554.—Mechanical Stage.

The mirror-bar of this instrument can be brought above the stage for the illumination of opaque objects, thus enabling us to dispense with a bull's-eye lens on a stand.

This instrument is furnished with one eye-piece, but additional eye-pieces may be obtained. If we should have only one eye-piece we would order a "B" eye-piece, but if we could have two we would take the "A" for common use, and "C" for occasional amplification. With the "B" ocular the two objectives give two powers, about 54 and 250 diameters, with the tube drawn out; with "A" and "C" oculars, four powers, 46, 80, 210, and 375 diameters.

By using the tube without extension, four more powers may be obtained, commencing with about 25 diameters and intermediate between the others.

Other objectives may be added as inclination may demand or the means allow. We append a table showing powers to be obtained by additional lenses.

LINEAR MAGNIFYING POWERS OF OBJECTIVES AND EYE-PIECES, WITH TUBE OF STANDARD LENGTH.

Objectives.	4 inch.	3 inch.	2 inch.	1 inch.	¾ inch.	½ inch.	4/10 inch.	¼ inch.	1/5 inch.	1/6 inch.	1/8 inch.	1/10 inch.	1/12 inch.	1/16 inch.
A or 1½.	12	18	25	46	50	92	130	210	275	325	400	550	650	800
B or 1..	15	23	30	54	70	110	160	250	325	390	490	650	775	980
C or ¾..	23	30	45	80	90	165	240	375	485	580	750	970	1,160	1,500
D or ½..	30	45	60	108	140	220	320	500	650	780	980	1,300	1,550	1,960

Other accessories, as revolving stage, graduated mirror-bar with substage, allowing the use of polariscope or paraboloid illuminator, etc., may all be added to this instrument, which is made firm enough to admit of use with quite high powers. Of course such instruments as Beck's *Ideal*, *Economic*, or *National*, or Bausch & Lomb's *Investigator* or *Professional* microscopes, or the larger instruments of Zentmayer and others, costing from $75 to $200 or more, are superior, and a binocular microscope with two tubes, giving stereoscopic effects, is well adapted for the examination of minute seeds and surfaces of leaves, etc., but the "Model" microscopes will do the work well and satisfactorily.

Among high-priced instruments there is much room for choice, but of the cheaper instruments we believe none excel those of Bausch & Lomb's manufacture in convenience of the stands and quality of lenses. There may be some who cannot afford the outlay of $45 for a microscope, and they will find some such instrument as Bausch & Lomb's *Family* Microscope for $23, or their *Library* microscope for $12, to be quite serviceable, for they can obtain much information and prepare a large collection of slides by the aid of one of these cheap instruments. Still cheaper instruments can be obtained, but they are not to be recommended, unless the choice is narrowed down to one of these or none at all.

Other manufacturers also furnish good instruments, and their price-lists may be consulted. We mention the above-named instruments simply because we have seen them and know them to be good.

In addition to the microscope, some other apparatuses will be required, some of which are necessary, while others, though not necessary, are very useful.

We may sometimes have occasion to measure objects which we are examining. Various methods may be adopted to ascertain the real size of the object, the simplest being by means of the *stage-micrometer*, a glass slide on which a scale is engraved. The object to be measured is laid on this glass slide in a drop of fluid and covered with a cover-glass. It is then placed under the microscope, and its size ascertained just as if a large object were laid on a yard-stick.

It may be desirable to obtain a picture of some of the objects we see. To draw them by any method is usually a waste of time, and photography should be employed for this purpose. But it is beyond the province of this book to give instruction in that useful art. We prefer to make our drawings off-hand, simply glancing into the microscope, and then drawing on the paper what we see; but unfortunately not everybody can do this, and appliances to aid in the drawing are required. The simplest aid is a *camera lucida*, consisting of a plate of glass of a neutral

tint which can be attached to the eye-piece. The microscope is inclined, and a piece of white paper laid on the table below the camera lucida, and shaded so that but little light can fall upon it. By now looking down upon the upper surface of the neutral-tint glass the image seems to be projected upon the paper, and may be traced with a pencil. Considerable practice will be required, and even then the results are not of the best. If a person can draw pretty well, we believe he can make as good a sketch free-hand without the camera, and if he cannot draw, he will find the camera of but little use.

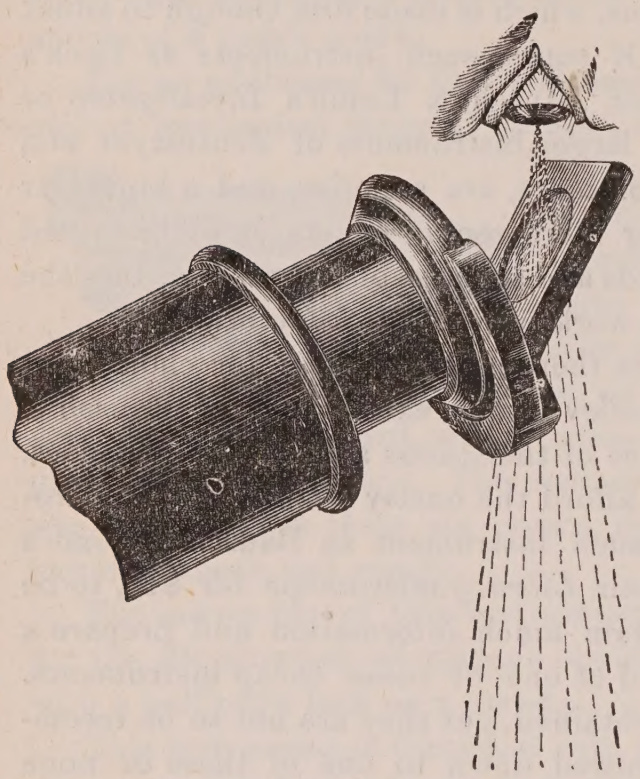


FIG. 555.—Camera Lucida.

We have used a method illustrated in Fig. 556. The microscope is raised on a block and brought to a horizontal position. The eye-lens is brought close up to a right-angled (or so-called *inverting* or *reflecting*) prism, which is placed over a hole in the top of a box. To prevent extraneous light from entering, a black cloth is laid over the prism and ocular. The open end of the box is toward the draughtsman, and farthest from the microscope, and is closed by an opaque cloth curtain with a sleeve and elastic band for the admission of the hand. A small hole in the top of the box enables one to look into the dark chamber and see the image projected upon a sheet of paper lying upon the floor of the box. It is an easy matter to trace the image, and this apparatus offers the advantage that the image remains stationary and of uniform size, while with the camera lucida it moves with every motion of the eye, and with each wink or breath.

The prism, which is expensive, may be replaced by a bit of looking-glass placed at an angle of forty-five degrees.

We employ daylight in using this apparatus, but the mirror may be swung to one side and a lamp placed in the position usually occupied by the mirror, and, if necessary, a bull's-eye lens may be interposed to increase the light.

When using artificial light the curtain is, of course, superfluous, and may be removed.

This simple apparatus enables us also to measure easily both the rate of enlargement and the actual size of an object. To ascertain the first, we place on the stage the stage-micrometer, and in the box a sheet of paper, raised by books if necessary, so that its surface is just ten inches below the centre of the eye-lens, minus the distance of the eye-lens from the reflecting surface. Thus, if the distance from the centre of the eye-lens to the part of the mirror-glass on the same hori-

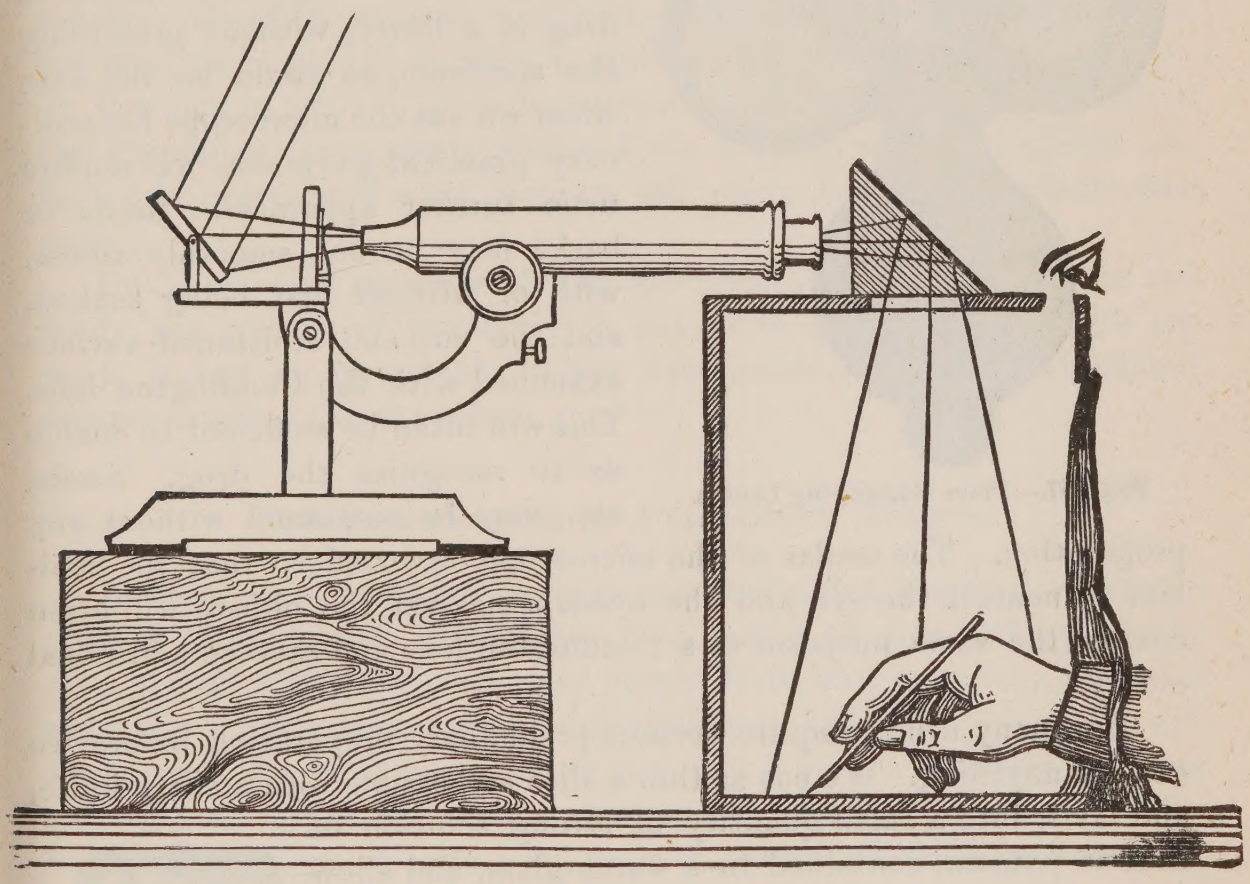


FIG. 556.—Apparatus for Drawing.

zontal line is one inch, the paper should be nine inches below the centre of the eye-lens. The tube should also be drawn out to ten inches in length.

We now focus so that the image is clear and sharp on the paper, and then measure with a foot-rule.

We will suppose that ten divisions of the micrometer scale, in which each division is $\frac{1}{100}$ of an inch, measure $6\frac{1}{2}$ inches on the paper. The ten divisions are $\frac{1}{10}$ of an inch ; $\frac{1}{10}$ of an inch is contained in $6\frac{1}{2}$ inches sixty-five times ; the rate of enlargement therefore is sixty-five diameters. We now remove the scale and insert an object which we wish to measure. The image is measured in the same manner with the rule, and the length thus determined is divided by sixty-five to ascer-

tain the actual size of the object. If, for instance, we find that the image is 8½ inches, then the object measures 0.13 inch.

Many drugs require a low power for examination, as, for instance, various seeds, or the sections of many roots, etc. For this purpose the ordinary magnifiers (Fig. 557) or a "Coddington lens" (Fig. 558) will be sufficient.

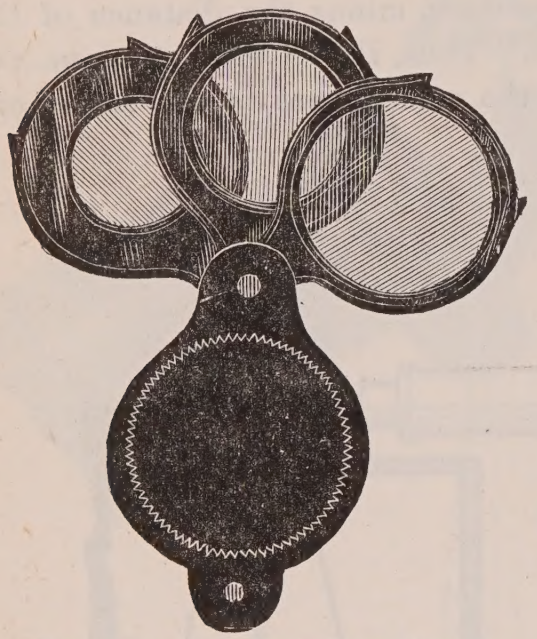


Fig. 557.—Plain Magnifying Lenses.

If we wish simply to examine a drug in a hurry, without preserving the specimen, as would be the case when we use the microscope for ordinary practical purposes, we require little further apparatus. Roots or barks may be cut smoothly across, with or without first being soaked, and the cut and moistened surface examined with the Coddington lens. This will often be sufficient to enable us to recognize the drug. Seeds, etc., may be examined without any preparation. The ocular of the microscope, reversed so that the field-lens is nearest the eye and the eye-lens nearest the object, will often answer the same purposes as a Coddington lens and save an additional outlay.

But many drugs require certain preliminary preparation before we can see anything. We cut as thin a slice as possible with a sharp knife, and lay it into a small quantity of strong solution of caustic potassa, contained in a watch-glass, and allow it to macerate for a few minutes to half an hour, by which time most of the coloring matter and cell contents will have been dissolved. We can then wash it in a few changes of water, and, if not clear enough, in a little solution of chlorinated soda. The section is then soaked for a few moments in glycerin, transferred to a slip of clear glass, covered with a drop of glycerin and a thin cover-glass in such a manner that as few air-bubbles as possible may remain. It is then ready for examination with the microscope. In many cases even this is not necessary, and the section may be placed at once in a drop of water, glycerin, or solution of potassa on the slide and covered with the cover-glass, but the result will not be as satisfactory as when treated as above. This seems to be difficult and to require much time,

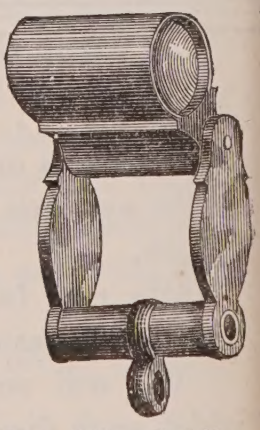


Fig. 558.—Coddington Lens.

but the actual time consumed in the various steps of the proceeding need not occupy more than two or three minutes, the time while waiting for the maceration of the section being of course available for other work.

Powdered drugs may be moistened with turpentine and placed on a slide and covered, when they are ready for examination ; starches, however, are rendered so transparent by this means that they can only be seen by aid of the polariscope. Or the powder may be moistened with solution of caustic potassa, and placed on the glass slip and covered, but must be examined at once, as starches are soon dissolved.

Powders in alcohol, glycerin, turpentine, or water, will often reveal the ingredients very nicely, and a little practice will soon enable one to judge pretty well what medium will prove best in each individual case.

But if we wish to preserve the specimens for future reference and study, the process of preparing is not quite so simple, although the work is not as formidable as the description of making permanent mounts might make it appear.

The Preparation of Permanent Mounts.

In order to be prepared to make mounted slides, the student should provide himself with glass slides 1×3 inches in size, and preferably with ground edges, which he may obtain from any optician ; also with some thin glass covers, round being preferred, and of two or three different sizes, the most useful being $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ inch in diameter. Square cover-glasses are a trifle cheaper, but do not look so well. A few dozen brass curtain-rings for cells may be also purchased, the best size being $\frac{5}{8}$ inch outside diameter.

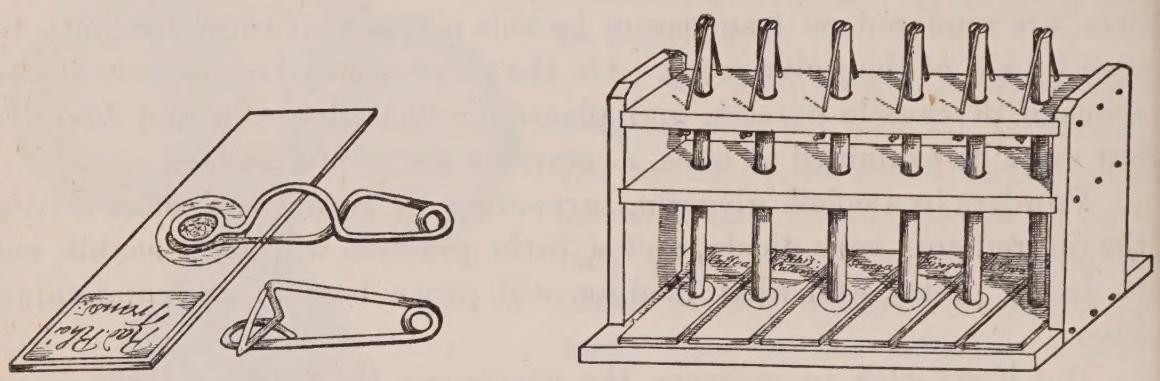
The student will also provide himself with a few camel's-hair brushes of different sizes ; a few watch-glasses ; a few glass or porcelain ointment jars with covers ; a delicate pair of scissors, and one or two small knives with handles like the smallest knife from the ordinary dissecting-cases or from a case of eye instruments, and two small brass or steel forceps.

He will also require a few needles, which may be fixed with the eye ends in wooden handles of the size of small pen-holders ; one of these needles may remain straight, a second one is curved at the point by first heating to red heat in a flame, and a third is ground flat and thin at the point.

He also should obtain a dozen or more wire-spring clips to hold the cover-glass in place until the balsam or cement is dry. The form shown

in the figure as holding down the cover is one of the best. An excellent clip, arranged so that we can regulate the pressure on the cover, is the *Nassau Spiral Spring Clip,* which can be obtained from McAllister.

Instead of buying spring clips we may exercise a little ingenuity and make them very cheaply from wire hair-pins, by bending them as



FIGS. 559–561.—Compressorium, for mounting slides.

shown in the figure. They are not quite as convenient as the others, but the cost is scarcely anything.

Another apparatus may be used for the same purpose, which can be easily made from an old cigar-box and round sticks, and a bit of elastic rubber band. The figure explains the little contrivance well enough to require no further description, except that the sticks are a little over an inch apart, and half an inch or less in thickness.

Or stiff wires may be used, and a weight of lead cast on the upper end, and the lower end inserted into a cork. Such an apparatus answers very well and costs nothing, except the labor.

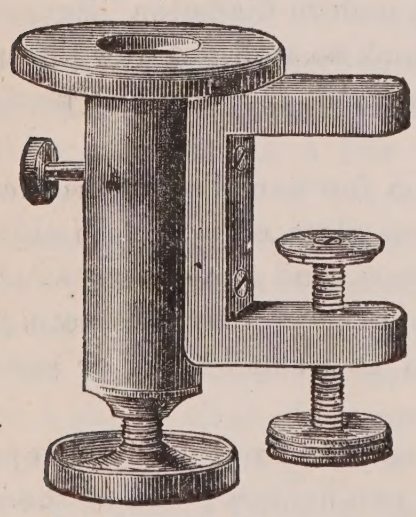


FIG. 562.—Section-cutter.

We also must have a knife for cutting sections, for which a very sharp pocket-knife may be used if the outlay for a section-cutter cannot be afforded. A sharp pocket-knife will enable us to cut fairly useful sections, but to do good work we must have a section-cutter (Fig. 562) into which we can fasten our material so that we can regulate the thickness of the slice we cut off, and the cheapest and yet serviceable section-cutter we know of for this purpose is McAllister's, for $5. Other and more complete section-cutters can be bought for $7.50 and upward. The best knife we have ever used for cutting vegetable sections was a large amputating knife.

We cannot make neat slides, though we may make useful ones, with-

out a turn-table (Fig. 563). A plain one will answer, but a self-centring one, with hand-rest, will enable one to do very fine work.

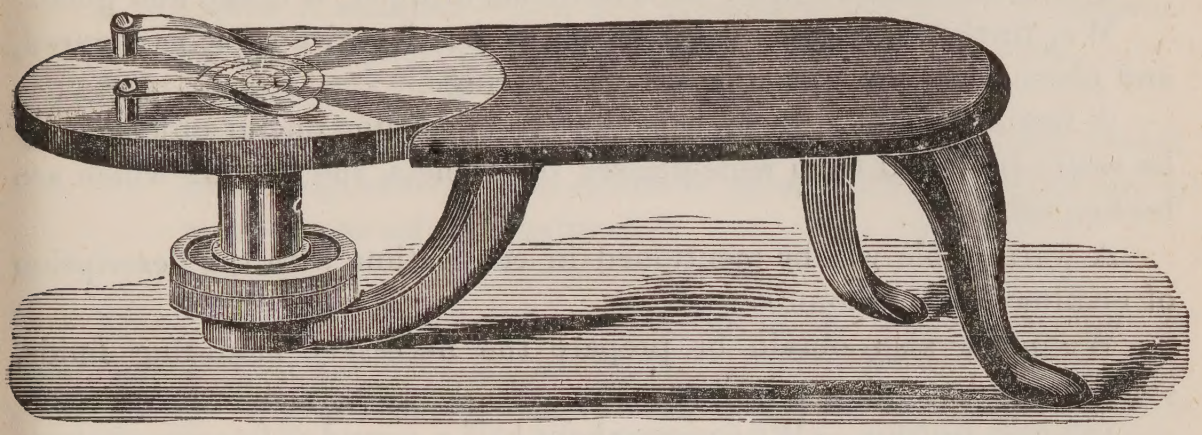
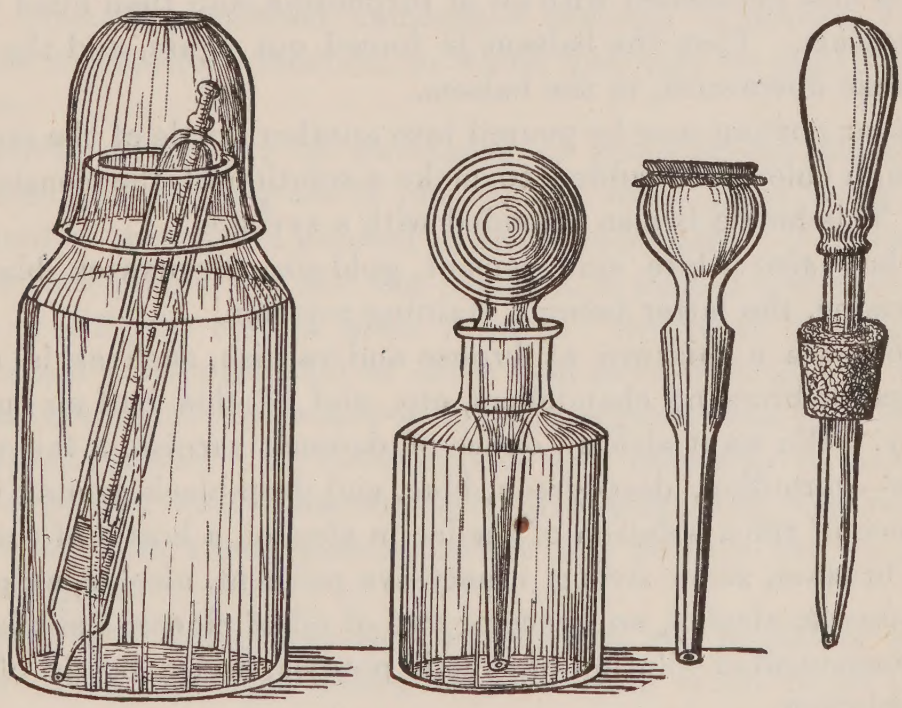


FIG. 563.—Turn-table.

We may also purchase a few bottles, from the optician, of the form shown in the illustrations, for the purpose of dropping some of the liquids used for mounting, or we may make bottles for this purpose by providing a few one-ounce vials, with a perforated rubber cork, into which we insert a common dropper with rubber bulb. One of the bottles in the figure



FIGS. 564–567.—Bottles used in mounting microscopic sections.

is provided with a stopper having a hollow glass bulb above and an elongated tube below. By warming, the bulb air is expelled, and on cooling, the liquid ascends. In using, the warmth of the hand is made to expand the air, and the liquid is forced out drop by drop.

Another form of stopper is also figured, in which the upper funnel-

like bulb is tied over with rubber. The liquid is expelled drop by drop upon pressing the rubber.

The home-made stopper, with medicine-dropper, is cheap and good.

We, furthermore, purchase one or two bottles with caps, as figured, and place into each a small glass male syringe.

A few bell-glasses, to prevent dust from settling on our objects, may be easily prepared from wine-glasses or goblets, the feet of which are broken off.

A warm table will be mentioned in connection with the description of making balsam mounts.

We must also obtain or prepare the necessary mounting fluids, cements, and staining solutions.

Canada Balsam.—We expose about half a pound of fine clear balsam of fir to a warm temperature, by placing the bottle in a sand-bath on a stove, taking care that no dust can fall into the bottle while the volatile oil is allowed to escape (by inverting a tumbler over the neck of the bottle), until upon cooling the balsam is semisolid, yielding to the pressure of the finger as putty would yield. A small quantity of this balsam, while warm, is poured into the bottle with the cap and syringe. The syringe is first moistened with oil of turpentine, and then filled with the melted balsam. Then the balsam is forced out again, and the syringe kept, nozzle downward, in the balsam.

Another portion may be poured into another bottle of the same kind, and enough chloroform added to make a solution of the consistence of honey. This bottle is also provided with a syringe.

We buy also white zinc cement, gold-size, Brunswick black, and picro-carmine, the latter being a staining solution.

We prepare a mixture of bronze and varnish, such as is used by gas-fitters for bronzing chandeliers, etc., and of this half an ounce will be plenty. We want also an ounce of dammar varnish, a few tubes of oil colors—vermilion, deep green, blue, and drop-black ground in japan—an ounce of thick solution of shellac in alcohol, a bottle of turpentine to clean brushes, some strong ninety-five per cent. alcohol, an ounce or two of *absolute* alcohol, an ounce or two of oil of cloves, a similar quantity of concentrated solution of caustic potassa, and a bottle of Labarraque's solution.

We may also prepare some of the following fluids for mounting our specimens:

1. Distilled water.
2. Distilled water with five to ten per cent. carbolic acid.
3. Camphor-water.

4. Creosote-water, by shaking a drop or two of creosote in an ounce of water.
5. Mixtures of camphor-water and glycerin in different proportions.
6. Glycerin, camphor-water, and alcohol; equal parts of each.
7. Pure glycerin.
8. A drachm of chloroform in eight ounces of distilled water. Shake vigorously. The excess of chloroform settles and serves to keep the solution saturated.

All of the above fluids may be put up in the bottles with rubber corks and drop-tubes, or in the more expensive bottles with funnel-shaped tops or glass bulbs. They all are useful for mounting vegetable sections and tissues, but we cannot dwell on the special indications for their use, except to state that the more delicate the tissues the less glycerin should be used, as this renders the tissues transparent. Woody roots, woods, or barks may be mounted in pure glycerin; while starches, soft pith or parenchyma, fungi, yeast-cells, etc., are better mounted in the more watery fluids. Objects mounted in pure water sometimes become mouldy.

For preserving finished unmounted sections in bottles, Formula 6 furnishes an excellent medium, in which they may be kept for months or years.

Glycerin Jelly may be purchased, or prepared as follows: Fine, transparent, shred isinglass is placed in a clean glass vessel, covered with distilled water, and allowed to swell over night. The superfluous water is then poured off, and the isinglass is melted over a water-bath, so that a stiff jelly results when it cools. One-tenth as much purest glycerin and a little solution of boric acid or carbolic acid in camphor-water is then added; the whole is liquefied together and filtered through well-washed muslin. A little alcohol may then also be added. The liquid is poured into wide-mouthed, glass-stoppered one-ounce vials and set away in a cool place, where it may be kept for an indefinite length of time.

A portion of this preparation, while warm, may be put up in a bottle with dropping tube, one with glass bulb being much to be preferred, even though all the other fluids are put up in the home-made bottles with drop-tubes.

All of the bottles with Canada balsam, Brunswick black, cements, jelly, and fluids should be kept in a tray or box with a dust-tight cover. The pincers, clips, needles, knives, slides, covers, etc., may be put up in another tray with partitions, so that each thing may have its appropriate place.

We are now ready to go to work mounting slides. There are practically three methods of mounting our slides: dry; in balsam; or in fluids. We will first consider dry mounting. Of many drugs we may simply wish to examine the surface; for instance, when comparing digitalis leaves with verbascum leaves, which are sometimes substituted for the first, or in examining the various seeds. For such objects we prepare opaque mounts, which may be made in many different ways, of which we shall describe only two of the most useful.

First.—We prepare a disk of paper, as follows: A sheet of paper which is dead-black on one side is pasted on a sheet of colored paper and dried under pressure, so that the resulting double sheet has one side black and the other colored. From this paper we prepare disks, $\frac{3}{4}$ inch diameter, by laying on a piece of sole-leather and punching out with a punch of that size. This disk is pasted on the middle of a glass slide, 3×1 inch, with thin rice starch or tragacanth paste, and black side uppermost. A disk of the same size is then punched from thick paper or pasteboard of a thickness slightly exceeding that of the object we intend to mount. From the centre of this disk a hole about $\frac{1}{2}$ inch in diameter is punched, leaving a circle or ring of about $\frac{1}{8}$ inch in width. This is accurately pasted on the dead-black disk so as to produce a cell with a black bottom. We prepare a number of these slides and let them dry under slight pressure, so as to have the top of the paper cell perfectly level. We also make some cells in the same way, in which the bottom consists of fine, smooth, unglazed white paper.

We then prepare our objects by thoroughly drying them, if they are seeds, etc., but if a leaf is to be mounted so as to show its surface opaque, we first hold it in steam until soft, and then punch out a number of circular disks with a cork-borer, and of somewhat less diameter than the inside of the paper cell. These pieces are then placed between bibulous paper and thoroughly dried under just enough pressure to make them retain their circular form and remain flat. When quite dry they are fastened to the bottom of the cell with a little shellac varnish, liquid glue, or solution of gelatine, and pressed down carefully with a cork of about the diameter of the piece of leaf, and held until securely fastened; or instead of holding, a slight weight is laid on top of the cork.

A $\frac{3}{4}$-inch cover-glass is then cleaned by dipping into water and rubbing between two thicknesses of filtering paper and between the thumb and index-finger, and by finally polishing with a chamois leather or fine silk handkerchief. The top of the paper cell is then moistened with paste, and the cover-glass is laid accurately upon the centre of the cell, so that the margin of the cell and glass coincide. Finally, a strip

of glazed colored paper, $1\frac{1}{4}$ inch wide and somewhat longer, is taken, and a hole of the same size as the interior of the cell punched from its middle. This strip is covered with paste on the plain side and pasted over the cover-glass and cell, so that the opening is exactly over the opening of the cell and its length at right angles to the length of the slide; the paper is then well pressed down and snugly fitted around the edges of the cell. When dry, the paper projecting over the edge of the slide is smoothly trimmed off with a sharp knife or scissors, and the slide is finished. It is then a glass slide, with clear glass below and along the edges, showing a colored circular disk on a white square when looking through the glass from below, and a colored square with an opening exposing the interior of the cell when looked at from above.

The ends of the slides are clear glass, and on the left end a label is pasted for the name of the preparation, and the end to the right remains free for handling the slide with the right hand.

In making opaque mounts, dark-colored objects are best displayed on a white background, and light-colored objects on a dark background.

Second.—Another method of opaque mounts is made in the "Griffith" cell, which is made in the following manner: Place the slide on the turn-table and rotate it rapidly by moving the wheel below the table with the index or middle finger of the left hand in a direction contrary to the hands of a watch. Dip a camel's-hair pencil into the white zinc cement, which has been stirred up thoroughly yet carefully, so as to avoid air-bubbles, and hold the brush on the glass slide, a little to the right of the centre, so that the glass rotates away from the brush and not toward it (Fig. 568). A circle or disk is very easily painted on the glass slide in this manner. In making a cell for an opaque slide, paint a disk about $\frac{5}{8}$ inch in diameter, as shown by the circles engraved on the plate of the turn-table, and then lay a curtain-ring (also $\frac{5}{8}$ inch diameter) on the disk so as to be exactly in the centre, which is easily seen when the table rotates. Then carefully paint the curtain-ring with white zinc cement while rotating, but without moving it from the centre. Lay the slide away until the cell is thoroughly dry and hard.

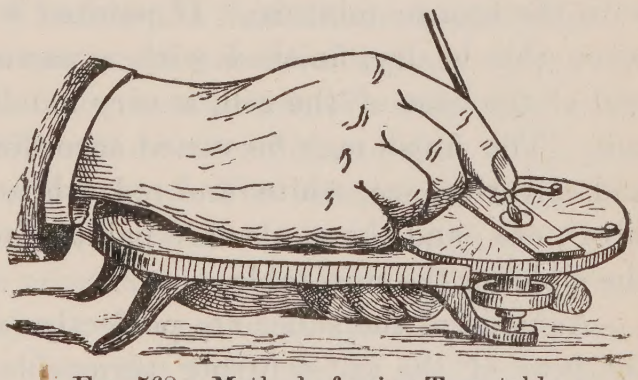


FIG. 568.—Method of using Turn-table.

If the cement becomes thick and does not flow readily, add benzole, and in case the cell becomes rough, dip the brush in benzole and smooth it. Use a brush well filled with cement to produce a smooth back-

ground. This background, when dry, is beautifully smooth and white, resembling fine porcelain, and may be used for dark-colored objects. If a dark background is desired, mix a little of the ivory drop-black on a glass slab with turpentine, and replacing the slide, when dry, on the turn-table, paint a black disk in the centre and let it dry. This makes a dead-black ground. A disk painted with asphalt gives a glossy background ; but this should be covered with a small cover-glass to prevent the object sinking into the asphalt in warm weather.

The objects are fastened in this cell just as in the paper cell. In all these opaque cell-mounts use only small quantities of cement to fasten down the object, so that this may entirely cover the spot of glue or shellac varnish, as otherwise an unsightly blotch is shown in the mount.

When the cement used to fasten the object is perfectly dry, the slide is replaced on the turn-table and the top of the ring is freshly painted with white zinc cement. Then the cleaned cover-glass is slightly warmed to dry it thoroughly, and then dropped on the ring into its place. When hard, the outside of the cell may be painted with any of the tube colors mixed with dammar varnish and turpentine, or with the bronze mixture. If painted with deep olive-green color, and when this is dry, finished with a narrow circle of gold bronze on top and at the base of the cell, a very handsomely finished slide is the result. The finish may be varied according to taste, red and black, blue and silver-bronze, white and red, white and blue, white and gold or silver, etc., and the circles are painted on with small pencils by rotating the slide on the turn-table.

As none of the slides are perfectly rectangular, it is best that one of the jaws of the self-centring turn-table be marked by notching with a file, and then if a small paper is pasted in the corner, which is held by this jaw, and the same corner always placed in the marked jaw, the slide will always be exactly centred, and any circle which is painted on the slide will be exactly concentric with any other circle. This paper can be used as a temporary label.

Third.—The following method of dry mounting is very simple, but is only adapted to a limited number of objects, such as vegetable hairs, epidermides, etc., which are to be mounted dry and transparent:

A piece of writing-paper is coated with shellac varnish on both sides and dried. From this rings are punched by means of the two punches already mentioned, and a number may be prepared at a time, so as to have them ready when wanted.

The ring of paper is laid on a clean slide, carefully centred ; the object is laid in the middle of the opening, and a cover-glass is placed over the ring. On top of the cover-glass is placed another glass slide,

and the two slides are then gently pressed together to hold cell and cover-glass in place, and then the whole is slightly warmed until the shellac adheres closely to the slide and cover-glass. The two slides are held together until the whole is cool, when the upper is lifted off and the slide with mounted cell placed on the turn-table and painted with ornamental colors as above. Of course the thickness of the paper may be varied, but the method is best for very thin objects and with very thin paper.

We come now to the consideration of balsam mounts, but as this process is mostly used for sections, we must first consider how these sections are made.

The substance from which we desire to cut a section is soaked over night in water to soften it, or if it contains much resin, the resin may first be extracted with alcohol before softening in water. Some woody stems, roots, and barks may require boiling in water or in alcohol and water to render them sufficiently soft for cutting. If we work without a section-cutter, we must manage as best we can to cut off as thin slices of uniform thickness as possible, and it is better to cut off quite a number, because many may spoil before the final mount is complete.

If the student works with a section-cutter in which an extra tube moves up and down in the well of the instrument, the substance to be cut is wedged into this tube with cork or elder pith, so that it projects about one-third of an inch above the tube. The tube is then lowered in the well until the top of the substance to be cut is lowered below the surface of the glass plate. The micrometer screw below then is turned until the substance slightly projects above the surface, when the projecting part is cut off with a sharp flat knife by an oblique drawing motion if the section-cutter must be held in the hand, or an oblique pushing motion if it can be fastened to the table with a clamp. When the substance presents an even upper surface, the screw is turned to raise the substance a thousandth part of an inch, and we attempt to take a slice. If we cannot cut so thin a slice of that particular substance, we raise it a little more, until we ascertain what is the finest section we can cut, and then we cut away the remaining projecting portion in sections of that thickness. Allowing for all tearing and spoiling, we ought to have thirty to fifty perfect sections from the one-third of an inch of drug. These sections may be placed into one of the porcelain saucers, carefully washed with a camel's-hair pencil in distilled water, and transferred with a brush to a small vial filled with the mixture of glycerin, camphor-water, and alcohol, in which we can keep the sections until we want to mount them or prepare them differently.

If the section-cutter has no tube to fit into the well, we wedge the

substance in the well direct; but this is more difficult, because as the brass piston is raised the substance is apt to become loose, and it is more difficult to cut even sections. To avoid tearing the sections, both the surface of the drug to be cut and the knife ought to be kept well wet with water, and the section is floated from the knife by dipping this in water and taking the section off with a camel's-hair brush.

Another method which we have tried, and which we find well adapted, especially to small objects like seeds or the fruits of the umbelliferæ, such as fennel or anise, is to embed in paraffin. This is easily and cheaply done, as described by E. L. Cheeseman.* "Make a short paper tube the same size as the well of the section-cutter, by rolling a strip of paper around a cylinder; fit a cork to one end of the tube and attach to the upper side of the cork, by cement or otherwise, the specimen you wish to cut (previously prepared by soaking or otherwise), in such a manner that it will stand upright in the tube; now fill the tube with melted paraffin; when cool remove the paper, and you have a plug of paraffin enclosing the specimen. I usually make several of these plugs at a time, and keep them in alcohol until wanted." A mould of brass similar to a suppository mould, in two halves, clamped together, and closed below with corks, to hold the specimens, will give better results. When ready, all of the wells can be filled at once, and when cool the clamp is taken off and a half dozen plugs are ready. These plugs are more uniform and cylindrical than those made in paper. They are placed into the well of the section-cutter, and slices are cut off with the wet knife, as already explained. The sections with the paraffin adhering are washed in benzine, then in alcohol, and are then transferred to the mixture of glycerin, alcohol, and camphor-water.

Of these sections we should mount one (without any further preparation than to allow the color to soak out of it in several successive portions of the above fluid, if necessary) in glycerin jelly, glycerin, or some one of the other fluids already mentioned, so as to show the cell contents, starch, etc., a knowledge of which is necessary for the study of the powders of the drugs.

But for the ordinary purposes of the pharmacist, to study the general structure of the drug and the relations of the different tissues to each other, the cell contents must be removed from the cell; and this is especially necessary if we wish to mount stained sections in balsam.

We have found it best for this purpose to place the sections in a drachm or two of distilled water, and to add six or eight drops of

* American Monthly Microscopical Journal, June, 1881.

the concentrated solution of caustic potassa and a half drachm of Labarraque's solution. This removes starch, protoplasm, chlorophyll, etc., and leaves only the cell-walls, which are at the same time bleached. To succeed nicely in this, however, the sections should be thinner than the thickness of any of the cells, so that each cell is opened into, either from the upper or lower cut. In this solution the sections may remain for several days, or even weeks, as frequent examination with a pocket or Coddington lens will determine, and therefore some prefer to use undiluted Labarraque solution, which accomplishes the work more quickly ; but we have found our delicate sections go to pieces in this solution so often, if not removed at exactly the right time, that we no longer employ it. Some drugs resist almost all efforts to make good, clean sections, even on repeated changing from the alkaline solution to a dilute hydrochloric acid solution, and back again, so that we had to be satisfied with only moderately good results, though perhaps we were over-exacting in our requirements.

When the section is sufficiently clear we wash thoroughly with frequent changes of water, and then preserve the bleached sections in the same mixture used for the unbleached sections.

Another method of bleaching is to place the section into dilute chlorine water for a little time. Or we may place crystals of chlorate of potassium in a morphine vial, pour on a drachm or so of hydrochloric acid, and close the vial with a perforated cork through which a glass tube passes, which is bent so as to conduct the generated gas to the bottom of another vial, in which the sections are placed in distilled water. The *chlorine* gases which pass over bleach the sections without the destructive action of the Labarraque solution, and if the whole apparatus is set out of doors the process may be completed overnight without any annoyance from the chlorine fumes. The washing may be done by taking a two-necked Woulff's flask and placing the sections in this ; a funnel and filter is placed in one neck, and a rubber tube passed from the tube of the funnel to the bottom of the flask on the side opposite to the second neck, over which is tied a piece of *bobbinet* or coarse bolting-silk to prevent the sections being washed away. The whole is then placed under the tap of a hydrant, or some vessel from which the water may drop on the filter at such a rate that the filter does not overflow, and that the current within the bottle, while it turns the sections over and over, may not carry them against the strainer over the other neck of the flask. In a few hours, or overnight, the sections are well washed, and may then be preserved until wanted for mounting.

Sometimes we may wish to isolate the cells, which can be done by warming, or even boiling, small pieces of wood in nitric acid, to which

we gradually add bits of chlorate of potassium. Caution must be exercised, as dangerous explosions may occur, and the process should be conducted out of doors, as irritating vapors are evolved. When the process is completed we add water, and after gently shaking allow the cells to settle and decant. In this manner the cells may be thoroughly washed in several changes of clean or distilled water, and then preserved in the mixture of glycerin, alcohol, and water recommended for the preservation of sections.

Such isolated cells should be mounted in fluids.

If the student has a polarizer he may mount one of the bleached sections in Canada balsam, if it contains sclerenchyma tissue, as this polarizes well. Or a section containing starch may be mounted in balsam and affords a brilliant object for the polariscope. But without this accessory such mounts appear too transparent, and we may proceed to stain them by placing as many as we desire to mount in balsam in one of the porcelain saucers and dropping on them a few drops of picro-carmine. This is really a double staining process because it stains cell-walls of parenchyma cells red and of sclerenchyma cells yellow. After ten or fifteen minutes we drain off the staining solution and pour on a little strong (95 per cent.) alcohol, and gently wash the sections with a soft camel's-hair pencil. Then we transfer them to another saucer with a little more of the alcohol ; after a few minutes to *absolute* alcohol, and in another few minutes from this to oil of cloves. The first alcohol fixes the color and removes most of the water, the second portion of alcohol and the absolute alcohol remove all the water, and at last the oil of cloves displaces the absolute alcohol and the sections are ready for mounting in balsam.

We will do well to prepare quite a number of sections in this manner before proceeding to the final work.

We clean a few more slides than we expect to use, so as to make allowance for accidental soiling. We also clean a number of cover-glasses of the appropriate sizes for the sections we intend to mount, and place them in a rack made as shown in Fig. 569. A cardboard pasted on each end will prevent the cover-glasses from rolling out, but the cut shows one end open to give an idea of the little contrivance.

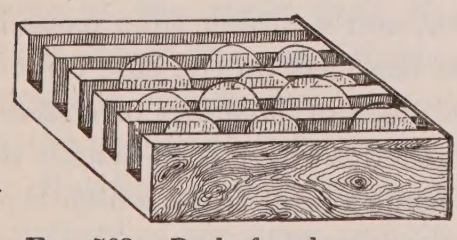


FIG. 569.—Rack for clean cover-glasses.

The next thing to get is a warm table, which we had made to order by a tinsmith, in the shape of a tin can or box a foot square on top and six inches deep. A cap is soldered in one corner to allow water to be poured in, and near it is a well, or circular cup-shaped depression, which

will contain the bottle with cap and syringe in which we have our hardened balsam. The whole fits into a wooden tray lined with woollen blanket to prevent too rapid radiation of the heat.

When the tin box is filled with water the flat top is a warm table which will never become overheated and will retain sufficient warmth for mounting fifty or more slides with one filling. We have mounted sixty-four slides in one evening after supper without reheating the water.

Those who do not wish to expend the necessary money for such a table, which, however, is quite cheap, may make a hot table by having a perfectly flat lid fitted to one of the saucepans from the kitchen.

Having procured the apparatus, and wishing to proceed, we fill the apparatus with water of about 150° or 175° F., screw the cap down to prevent loss of heat by the escape of vapor, set the balsam bottle into the cup-shaped depression made for it, and lay out six or eight clean slides on top of the table. When the balsam is fluid and the slides are warm we fill the syringe, and then place a few drops of the balsam on the centre of each slide. We next take a forceps, and taking the stained sections from the oil of cloves, one by one, we thrust each deep into the liquid balsam on a slide. The adhering oil of cloves will remain on the top of the balsam. We then take a second forceps, and lifting a cover-glass by its edge warm it slightly over a lamp and hold it over the drop of balsam on the slide. We take the straight needle in our left hand and hold it at the left margin of the balsam drop, or a little to the left of the section, in the centre, if the balsam has spread too far. The lower edge of the cover-glass is then steadied against the needle-point, and then the cover is slowly allowed to sink down on the balsam, driving before it all of the oil of cloves and some of the superfluous balsam. If we are not careful to push the section to the bottom of the drop of balsam the section occasionally may be carried out with the wave of balsam, and then we must use the flattened needle to push it back. We may also occasionally require the needles to remove air-bubbles, but with a little practice we soon learn to avoid the latter entirely.

By a little pushing or a little pressure on one side or the other of the cover-glass the section may be better centred, if necessary, and the slide is then laid on a board aside of the table to cool. When cool enough to handle, the cover-glass may be pressed down by one of the spring clips, to make the section perfectly flat, or it may be placed in the stand already mentioned (see Figs. 559–561).

Here the slides may remain until the balsam is sufficiently hardened, after which the superfluous balsam is removed with the warm point of a

penknife, but care must be taken not to get the point of the knife under the cover-glass, as the latter will otherwise easily be broken. The slide is then cleaned with a soft tooth-brush dipped in alcohol, then with soap and water, and finally rinsed in clear water, dried, and labelled. Or if a finish is desired the slide is placed in a turn-table and a ring of shellac varnish runs around so as to fill up the angle between the cover-glass and slide. When this is dry any of the various colored rings already mentioned may be applied, so as to overlap the edge of the cover, and a little beyond it, on the slide.

Another method of mounting in balsam is to use the hardened balsam, dissolved in chloroform or benzole to a syrupy consistence, and then proceeding just as in the other case, except that no warming is necessary, and that the section, when taken from the oil of cloves, is first rinsed or dipped in chloroform or benzole, as the case may be. It takes a long time for such a slide to dry, and we are free to confess that we do not like this method of mounting vegetable sections, though it is often of great use in histological work.

Pretty effects may be produced by double or triple staining, but it is beyond the province of this book to mention more than the necessary processes to secure specimens from drugs for practical study. We must refer for other information to special works on microscopy, or to the various journals on this branch of study. Special methods of mounting, which seldom, if ever, are required in the study of pharmacognosy, cannot be described in the limited space that we can devote to this subject.

By far the best preparations for the careful study of vegetable tissues are those which are mounted in one of the various fluids already mentioned ; but as the mounts in glycerin jelly present nearly all of the advantages of the fluid mounts, combined with the simplicity of the balsam mounts, we will describe this method of working before proceeding to a description of fluid mounts.

Glycerin jelly has already been mentioned, and we have learned that it is a strong glue with enough of glycerin to prevent its drying, and enough boric acid, borax, or carbolic acid to prevent moulding.

Some have found it difficult to avoid air-bubbles in mounting with this medium, but we have had little trouble from this source. We proceed as follows : We use the same warm table as in balsam mounting, but the temperature of the water must be much lower, just sufficient to liquefy the jelly. The jelly in the small bottle with dropping apparatus is placed in the cup-like well, where it soon becomes liquefied. A watch-glass with a small quantity of jelly is placed on the top of the table, and the sections to be mounted are transferred from the preserving fluid to

this glass and immersed in the fluid glycerin jelly, where they are left for a few minutes until they are thoroughly permeated by this mounting medium. Some omit this step and mount directly from the alcohol, water, or glycerin, but we believe this omission to be the cause of many of the air-bubbles and other difficulties which they have encountered in this method of making slides.

While the sections lie in this fluid we keep them well covered with a bell-glass to guard against dust, which is the greatest enemy of the microscopist. Air-bubbles and dust we believe to be the cause of much of the moral turpitude and profanity occasionally found among workers with the microscope.

The mounting itself is proceeded with exactly as in the case of the balsam mounts on the warm table, only using glycerin jelly instead of the liquefied balsam. After the cover is applied the slide is put away to cool, but the spring clips should not exert more pressure than just enough to keep the cover-glass in place and the object flat. As soon as cool, or within a few days thereafter, the slides may be cleaned by washing in ice-cold water with a soft brush to remove all superfluous jelly, rinsing in fresh ice-cold water and drying with blotting-paper, and when quite dry they may be finished by placing on the turn-table and painting on a ring with any of the cements, such as white zinc cement, dammar, balsam in chloroform or benzole, Brunswick black, or the last mixed with equal parts of gold-size. The ring is painted so as to be about one-eighth of an inch wide, and overlapping the edge of the cover-glass, so that the edge of the latter is about equally distant from the inner and outer edge of the ring, or but a trifle nearer the inner edge, but not nearer the outer edge, as that would weaken the hold of the cement on the slide. These rings may be finished in any of the fancy styles already described, but we prefer the black finish of the asphaltum or Brunswick black, which has a fine black gloss.

We can recommend this mounting as being exceedingly easy to execute, nearly as good as a fluid mount, and much more likely to be permanent than the latter, unless the manipulator is expert in mounting in cells with fluids. We would suggest that the beginner should mount an unbleached and a bleached section in this medium, and a stained section in balsam, and only venture on mounting in fluids after he has become somewhat experienced in the above processes.

The following plan has been suggested for the easy centring of the object and cover-glass : Place the slide in the self-centring turn-table, with the lower side up, and run a delicate circle upon it with a bit of water color, of the exact size of the cover-glass to be used. When mounting on the right side this serves as an excellent guide, or if the

preparation is to be a balsam mount, the colored ring may be painted on the upper surface and remain in the finished slide, or be covered with the subsequently added ornamental finish. We only use it on the under side, where it is washed away in the cleaning of the slide.

The reader who has attentively followed us so far, and has obtained a little experience in the use of the turn-table, will have no difficulty in mounting in fluids. We need but few materials or implements. We have already spoken of the fluids and the main indications for using those with or without glycerin. We wish only to add one more : one hundred parts glycerin, acidulated with one part acetic or formic acid, must be used if a section that has been stained in picro-carmine is to be mounted in fluid. We need the turn-table for fluid mounts, also the needles in handles, and one or two cements. We prefer Brunswick black (asphalt), or this mixed with equal parts of gold-size.

Shellac dissolved in alcohol is also employed, using only the clear solution, which is decanted into a clean bottle. A little mastic has been recommended as an addition, to give greater elasticity to this cement.

These cements are kept in wide-mouthed bottles, with *good velvety* corks, to avoid particles of the latter falling into the bottles. Into the bottom of the cork is inserted a small camel's-hair pencil, which remains in the cement when not taken out for use, thus retaining its softness. When used, the cork serves as a handle to the brush.

We think we cannot do better than to quote the following from the *American Monthly Microscopical Journal*, which will apply with slight alterations to any of the cements used in fluid mounting. The cement must be such as is not acted on by the fluid employed.

"The cell must first be made, and for this purpose shellac is the best cement ; it should be used rather thick, and a very deep cell can be turned up by means of the knife-blade and the turn-table. A number of cells of different depths should be kept on hand, so as to be perfectly dry and hard when they are wanted for use.

"The objects should be perfectly permeated by the fluid in which they are to be mounted, before they are placed in the cell. The mounting is conducted as follows :

"*a.* Choose a shellac cell of a suitable thickness, put it on the turn-table and run a layer of benzole-balsam upon it, using a solution that is just thin enough to flow freely. Set aside for about one minute or until a thin skin has formed upon the balsam.

"*b.* Invert the cover of a pill-box and lay the slide upon it, then place a large drop of the preservative within the cell, and cause it to flow so as to touch every part of the cell. Transfer the object to the slide and arrange it properly by means of needles.

"*c.* Take a mounted needle in the left hand, and in the right the cover in a pair of forceps. Place the needle-point on the cell on the left hand side, and place the edge of the cover against it on the cell; then let the cover down slowly, so as to disarrange the object as little as possible, breathing upon the lower surface, so that the fluid may readily come in contact with it. When the cover is down, press it into the still soft balsam, but apply the pressure only around the outside; otherwise too much fluid is likely to be forced out and a bubble of air will enter when the pressure is removed. Let the slide stand for a few minutes, then wash it carefully by a gentle current of water from a tap or sponge and set it aside to dry.

"*d.* When dry, run a circle of benzole-balsam around it, after which the slide can be laid aside for months before the finishing process is carried out. In this condition the object will keep for any length of time undisturbed, but after a while the balsam becomes very brittle, so that a more elastic cement is required to protect the slide from the effects of rough usage. We are accustomed to lay the slides away immediately after the last layer of balsam is applied, until a number have accumulated to undergo the finishing operations together.

"*e.* Finish the slides by applying several coats of the mixture of asphalt and gold-size, followed by a final coat of plain asphalt to give a glossy black.

"The above process will suffice for mounts in strong glycerin. Many mounters have discarded glycerin as a mounting medium because they have failed to find a cement that will retain the glycerin. They have tried shellac, but it has failed them. Now we speak from considerable experience with glycerin as a mounting medium, and we do not hesitate to assert that shellac will make a perfectly tight and impervious cell for a glycerin mount, and we prefer to use shellac instead of the benzole-balsam for mounting with strong glycerin. The secret of success seems to be in washing off every trace of the glycerin before the second coat of shellac is applied."

We have not had a very extended experience with shellac cells, but have had very satisfactory results with the plain asphalt varnish or Brunswick black. Instead of shellac we use this preparation and prepare a number of cells, which may be made deeper by turning up with a knife-point or by painting on several successive layers. These cells must be thoroughly hardened, in an oven, if necessary on account of want of time for spontaneous hardening. When ready to mount a preparation, place the glass slide on the turn-table and run a circle of Brunswick black on top of the cell, but be very careful never to let this ring reach to the inner margin of the cell, as otherwise the asphalt may

run in and spoil the mount. The fluid and object are placed in the cell, and the cover on the cell, as above described, except that instead of a pill-box we use a thick slab of plate-glass which we lay on a white or black paper according to circumstances. With black paper as a background we can see delicate objects in the cell much more plainly, and guard against displacement more easily than on a white background. We are also less liable to upset the slide than on the inverted lid of the pill-box.

To avoid subsequent running in of the cement or air which are the great dangers in this class of mounts, and the ruin of so many, we must be careful to use three precautions, which are essential to success.

Let the cell be a trifle larger than the cover, so that the cover will lie on the greater part of the cell, but not quite reach the outer margin. *When putting on the last asphaltum, or asphaltum and gold-size ring, just before mounting, do not put it on the inner one-third of the previously applied asphaltum ring which forms the cell,* for when the cover drops into place, capillary attraction will cause the fresh cement to run in to the inner margin of the cell, but will keep it from running *down* on the inner edge. If it runs down and touches the glass at the bottom of the cell ever so little, we believe the ultimate destruction of the slide is almost assured, by the continued drawing in of more asphaltum, a process that, once begun, may continue slowly, but surely, for years, until the bottom of the cell is covered with the cement and the object obliterated from sight.

When the object is to be mounted, put plenty of preservative fluid in the cell to fill it completely, and in dropping the cover-glass into its place, see that no air-bubble is retained in the cell. If such should be the case, it may sometimes be removed without raising the cover-glass, but in doing so we are very apt to get a little of the fresh asphaltum on the inner surface of the cell, endangering the mount as already explained. We will do better to raise the cover carefully and lay it away, add a little more of the fluid and lay on a clean cover. *Be sure to exert no pressure on the cover-glass except at the margin,* and even there only just sufficient to make the glass become attached to the fresh cement, which is easily seen by reflected light. As the glass is elastic, pressure in the middle of the cover will press out too much fluid. When the pressure is removed a vacuum occurs, and either asphaltum or air will enter. Even should this not immediately be the case, the continual strain of the glass to retain its position, will eventually draw in the cement.

When the cover-glass is firmly adherent all around, lay it away for a little while to harden, and then rinse thoroughly and dry it perfectly

before running on another ring of cement; then lay away to finish at leisure. *Be absolutely sure that the slide and cover-glass are dry before putting on the first outside ring of cement.* Let this ring slightly overlap the margin of the cover, and also the outside margin of the cell so as to reach the glass-slide. When dry add a second ring, slightly overlapping the first, a third slightly overlapping the second, and so on according to experience and judgment. We have found and believe that if several rings are put on, allowing each to dry before the next is added, using either asphaltum, or this with gold-size, for all except the last ring, making them of such width that the ring on top of the cover finally is even with the inside margin of the cell underneath and reaching out over the glass slide so that the whole ring is about $\frac{3}{16}$ inch wide, we have as nearly permanent a fluid mount as can be made. But all this trouble is in vain if the slide was not perfectly dry before putting on the first ring, for in that case the cement will probably crack off or become loosened in such a manner that evaporation can slowly take place, and then air will ultimately take the place of the water or alcohol of the fluid. To avoid possibilities of this kind, some have recommended to run a ring of some fresh cement, varying with the final finish of the slides, every few years. We have not found this to be necessary.

We have been thus minute in our description of fluid mounts because these are the preparations that will spoil, if any will do so. The glycerin jelly and balsam mounts are much less liable to injury. It is discouraging to see dozens or hundreds of slides, which have cost so much time and labor, irretrievably ruined for want of proper care when preparing them ; and as this care can only be exercised when we know the causes of the destruction of our specimens, we have been somewhat lengthy in describing this class of mounts.

A few words more need only be added. Sections of leaves may be cut by first soaking and then placing in the section-cutter between two pieces of paraffin. The sections must be treated only with water or glycerin, never with alcohol, if we wish to show them with the cell-contents, as chlorophyll is dissolved in the alcohol.

Bleached or stained sections are made in the manner already described.

By allowing the leaf to macerate in water, and exposed to the sunlight, the epidermis may after a time be pealed off, and, after washing, be carefully mounted in very dilute glycerin, in camphor-water or dry. In the latter case, float it into place on the slide, and then raise the slide out of the water and drain. When perfectly dry mount with the thin rings of shellac paper. The mounts in fluid are to be preferred ; the dry

mount is easier to make. By dipping the epidermis into some black ink or writing fluid, then rinsing in water, changing to alcohol, absolute alcohol, then oil of cloves, and finally mounting in balsam, we have obtained slides which show the structure of the epidermis with the boldness of a wood-cut.

Powders are examined by mounting in water or glycerin, after first allowing them to remain for some time in dilute alcohol to remove as much as possible of the color. This must never be done by Labarraque solution, etc., as an important constituent of the powder, the starch, is thereby destroyed. Sometimes it is advantageous to examine the dry powder in turpentine.

In adulterations starch plays an important part, and by destroying it we lose the evidence of their presence. In balsam mounts starch becomes so transparent as often to be quite imperceptible except by the aid of the polariscope.

Make preparations of all the substances you know to be used in adulterations, such as powdered beans, peas, potato starch, powdered cocoanut-shell, etc., so that you may know these substances when you see them. Also mount preparations from what you know to be pure drugs, and then any powder that you examine, which is said to be the powder of any drug, if it has histological elements in it which are not present in the pure powder, may be known to be adulterated, provided such foreign substances are present in appreciable proportions. A bit of dust, a shred of cotton, jute, or other fibre from the original package, the scale of an insect, an occasional vegetable hair, and foreign substances of that kind must not be regarded as evidence of wilful admixture and adulteration. It is not absolutely essential that we should be able to recognize the nature of the admixture, for if the powder is not pure we do not want it.

It is generally recommended that the student should make drawings by the aid of the camera lucida for future study. We believe this to be a waste of time, as it is just as easy to re-examine the object itself, and the time required to make a drawing can be more profitably employed.

In regard to the keeping of our slides but little need be said. We preserve them in shallow trays or drawers, and lying *flat*, especially if mounted in fluids. We keep them in a cool place, and in winter protect them from freezing if in water or watery fluid.

We believe that the microscope is as necessary an instrument in the drug-store as the mortar and pestle, and if in these pages we have offered assistance or encouragement to any one to enter upon the study of this fascinating and important branch of pharmacognosy, we are more than gratified.

THE MICROSCOPICAL STRUCTURE OF PLANTS.

In order to afford opportunity to become acquainted with the minute structure of plants to the extent to which this is necessary in the microscopic examination of drugs, we will endeavor in the following pages to illustrate the principal facts of vegetable histology by word and figure. We prefer to illustrate from preparations of drugs, when possible, so that the same study that is devoted to plant histology will advance our knowledge of pharmacognosy, while the specimens which the student may prepare to corroborate our remarks will be at the same time an addition to his cabinet of drug mounts.

We must presume that the student is familiar with general structural botany, as it is explained in works like "Gray's Lessons in Botany;" or if he is not, he would do well to read that book attentively before proceeding with the study of this chapter of our book. He will have learned that notwithstanding the multiplicity of plants and the apparently infinite variety of forms, the structure is yet very simple when compared with the organs of the animal kingdom.

In the flowering plants, for instance, there are but three different parts which are modified to answer various requirements, and all the organs may be shown to be derived from one of the three primary forms, *root*, *stem*, or *leaf*.

As we recognize the same limb in the pectoral fin of the fish, the wing of a bird or bat, the paddle of the whale, the foreleg of a quadruped, or the arms of the quadrumana or bimana, so we see the stem in branch or tendril, rhizome, tuber or bulb, or even in the pulpy mass of the strawberry.

But while the external configuration in the organs of the plant may undergo various modifications for many different purposes, we find but little difference in their minute structure, which is exceedingly simple, when compared with the complex histological composition of the animal organs.

The study of this branch of knowledge offers, therefore, comparatively little difficulty, and by a little application and effort any one may

acquire sufficient familiarity with the subject to be able to examine drugs with the microscope.

If we examine a small portion of any part of a plant under the microscope we will find that it is made up of a large number of small structures which we term *cells*. In the lowest order of plants, the algæ, we find many plants consisting of only one cell or of single rows of cells, and in some of these we can very conveniently study the phenomena of plant-life ; but we may also find good examples for this purpose in higher plants, as in the pulpy portion of fruits or in the growing and succulent parts of the stem, leaf, or root ; for instance, in the leaf of Agave or Vallisneria, or the pulp of the strawberry.

We will find that the cell (Fig. 570) consists of a *cell-wall* composed of *cellulose*, enclosing a substance which is called *protoplasm*, and within this is a small body termed a *nucleus*, which latter in turn may contain still smaller bodies termed *nucleoli*. Not all of these parts are absolutely necessary to a cell, for the cell-wall may be absent, as in the naked protoplasm of some young algæ, or the nucleus is not found, though this may depend on the fact that the consistence and refractive power of protoplasm and nucleus are alike, and in such cases the presence of the nucleus may often be demonstrated by staining with carmine.

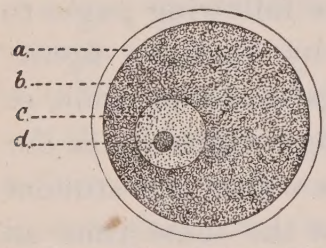


FIG. 570.—Primordial Cell of *Stephanosphæra pluvialis* (after Sachs). *a*, cell-wall; *b*, protoplasm; *c*, nucleus; *d*, nucleolus.

The protoplasm is the living part of the cell, and is necessary to a cell, while the nucleus is also living but may be absent, though when present it is only a part of the protoplasm. In ordinary language we often speak of a cell when we mean the empty cell-wall, which is without life as we shall presently learn. This conventional use of the term cell is perfectly permissible, but we must bear the distinction in mind.

The cell-wall is formed from the protoplasm, and is not living or taking part in the functions of life except in the sense that a hair on the head or the protruding end of a finger-nail is alive. It is called *formed material*, and, once formed, usually remains long after all life or activity has ceased in the part.

The size of vegetable cells is extremely variable, for while the average cell is stated by Carpenter to be about 0.085 millimeter ($\frac{1}{300}$ inch) in diameter, there are others fully 0.85 millimeter ($\frac{1}{30}$ inch), and some less than 0.0085 millimeter ($\frac{1}{3000}$ inch) in diameter.

We will first consider the cell contents. When the cell is young it is completely filled with protoplasm, a portion of which may be differentiated from the remainder so as to form the nucleus. The cell-wall

may not yet be formed in the cell's earlier stages, when a delicate layer of protoplasm on the outer surface envelops the remainder but still remains a part of the whole protoplasm. This soon becomes surrounded with the denser wall of cellulose, but may be separately shown by contracting the protoplasm by any medium which will abstract water from it, as alcohol, syrup, glycerin, or strong acids. In the illustration the contracted protoplasm in cells from the pulp of rhubarb root is shown. The delicate membrane surrounding it, but which is formed by the action of the reagents, is sometimes spoken of as the "primordial utricle."

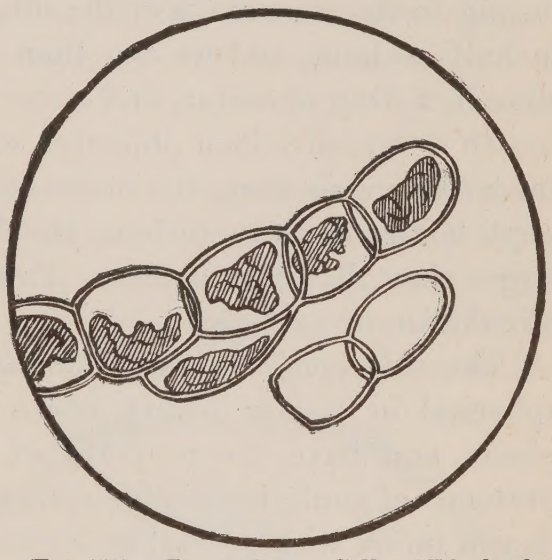


FIG. 571.—Parenchyma Cells of Rhubarb, mounted in balsam, two empty, the others showing contracted protoplasm.

As the cell grows older and larger, spaces occur in the protoplasm which are filled with a more watery fluid and which are termed *vacuoles*. The watery fluid is the *cell-sap*, which increases in volume until the protoplasm occupies only a small portion of the cell, and finally disappears altogether. The cell then ceases to take any active part in the life of the plant, and serves mechanically, by osmosis through its cell-walls or by capillary attraction, to carry moisture from the rootlets to the growing and living cells of the plant. At last even this may cease, and the cell-walls remain only filled with air or with other substances, as in the inner or heart-wood of many plants, and serve only as mechanical support to the living tissues.

But not only the protoplasm or nucleus may be found in the cells, but also various other substances that are formed by the protoplasm, or that are mechanically carried to the cell in solution in the sap that ascends from the soil and deposited in the cell, or are rendered insoluble by the action of organic acids, etc., as when lime-salts, meeting oxalic acid, are deposited as oxalate of lime.

As the protoplasm is the living part of the cell we would naturally expect to find it endowed with that fundamental property of all living substances, namely, motion. While it is probable that all protoplasm is in motion while alive, it is not always easy to show it. We cannot see motion in the air, except by the particles of dust or smoke floating in it, because the air is perfectly transparent. The same is true of protoplasm. Or the currents may be too slow for observation, or are checked entirely by the necessary injury the cell has undergone in its preparation for the microscopic examination. But we can demonstrate it beau-

tifully and with comparatively low power in Vallisneria, the beautiful grass-like blades of which are often found as ornaments in our aquaria. We carefully scrape away the outer cells and expose the inner larger cells. Often the shock of the injury checks the motion of the protoplasm, but by placing the prepared fragment in a little water and exposing to the warm rays of the sun, the motion will generally be restored in half an hour, and we can then place the leaf fragment on a glass-slide in a drop of water, and cover it with a thin cover-glass. The one-fourth or one-fifth inch objective will show the current of protoplasm as the latter crawls along the inside of the cell, and carries with it the chlorophyll bodies and the nucleus, the latter being colorless and somewhat larger than the other bodies. This motion of the protoplasm is called *circulation* or *cyclosis.*

The *chlorophyll bodies,* or *grains,* are small green particles, usually spherical in higher plants, which are found in all green parts of the plants, and have the property of decomposing carbon dioxide in the presence of sunlight and liberating the oxygen, while they fix the carbon in union with several molecules of water to form, directly or indirectly, protoplasm, starch, cellulose, lignin, gum, sugar, or the other substances, as oils, resins, waxes, alkaloids, acids, or other proximate principles, some of which require in addition nitrogen, which the plant can fix by taking it from ammonia, or small quantities of sulphur or other substances taken from the soil. Without chlorophyll the assimilation of plants would cease, and plant life as well as animal life would become impossible, for though there are plants that live without chlorophyll (*fungi*), these are parasites on organic substances and cannot live on crude mineral materials.

Chlorophyll is soluble in alcohol and imparts the green color to many of the tinctures and fluid extracts made from leaves, in which it abundantly occurs. We must, therefore, avoid alcohol in the mounting of sections of leaves when we want to show the chlorophyll bodies, and must mount in cells with watery fluids.

In some of the lowest living beings the protoplasm is colorless, as in *amœba,* but as we rise in the scale of life we find in the animals the blood corpuscles, in the plants chlorophyll grains. These are complementary in their action as well as in their color. The blood globules absorb oxygen from the air, and convey carbon dioxide from the tissues to the lungs to be exhaled, and the chlorophyll grains absorb the carbon dioxide, restoring the oxygen which was fixed by the animals. The chlorophyll bodies are practically the digestive apparatus of the plant.

There are also in some cells, as in the cotyledons of many seeds, peculiar proteine substances termed *aleurone granules,* usually much

smaller than starch grains, insoluble in water or alcohol, and embedded in albuminoid and oily fluids or substances. Some of these albuminoid or proteine substances assume the shape of particles with regular planes and angles, forming the *crystalloids*, and these in turn may inclose true crystals of calcium oxalate or roundish granular particles of double calcium or magnesium phosphate, called *globoids*. But as the study of these structures is not of very great importance to the pharmacognocist we must refer to larger text-books on the physiology of plants for further information.

Of more importance are the resin-masses, oil-globules, or coloring matters often deposited in the cells, but most important is the peculiar substance known as *starch*, which is very generally present and often completely fills the cells. This substance has the same relation to the vegetable economy that fat has to the animal, enabling the plant to live at its expense when other food is unobtainable, just as a well-fed animal can exist without nourishment until its own fat is consumed. Starch is the form in which the plant stores up nourishment which is not required for the immediate purposes of the plant, as in the various seeds of the cereals, in tuberous roots, etc., and these structures are the great fat-producing foods of the animal kingdom.

FIG. 572.—Potato Starch.

Starch consists of variously sized grains, of different and often peculiar or characteristic shape in different plants.

In the illustration (Fig. 572) we see potato starch in oval grains, a *hilum* or dot at one end, and a number of concentric lines. This is a large variety of starch, often used as an adulterant in powdered drugs, and therefore of special interest. The grains are loosely aggregated and separate from each other while in the cell. In the starch of sarsaparilla (Fig. 573), and of oats (Fig. 574), may be found compound grains, which assume various shapes according to the number of grains that unite together. When they break apart, the individual grains present an angular appearance. Curcuma starch is also shown in Fig. 575, and other starches are figured on pages 138 and 139.

It will prove of interest to study the shape of starch in peas, beans, potatoes, and the cereals, all of which varieties may occur in powdered

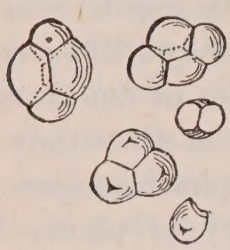


FIG. 573.—Starch of Sarsaparilla.

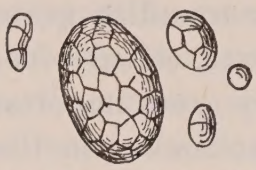


FIG. 574.—Starch of Oats.

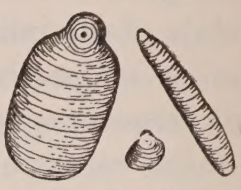
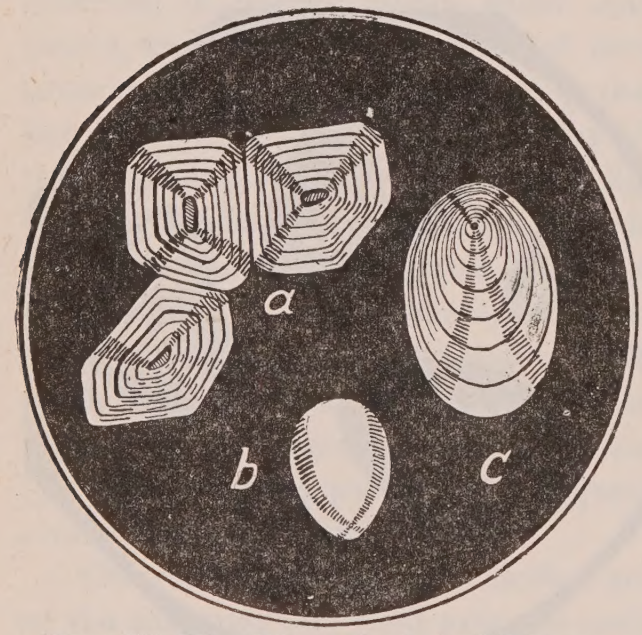


FIG. 575.—Starch of Curcuma.

drugs and spices. It is well also to observe the changes produced by parching or roasting, as they may be used in that condition for adulterating.

Starch grains polarize light beautifully, especially if mounted in balsam, showing a well-marked cross with its centre in the hilum (Figs. 576–578, *b* and *c*).



FIGS. 576–578.—Effects of polarized light on—*a*, Cinchona bast-cells, transverse section; *b*, Zedoary Starch; *c*, Potato Starch.

Cells may also contain certain inorganic substances, as silica, in the epidermis of equisetum or grasses, or crystals of oxalate of lime in rhubarb (Fig. 579). Other forms of crystals are found in the cuticle of the onion, and needle-like shapes in the cells of salep, the latter being called *raphides* (*raphis*, needle).

Crystals may also consist of carbonate of lime, which effervesce on the addition of dilute acid to the specimen on the slide, or of organic substances, such as alkaloids, etc.

We will now return to the consideration of the cell-wall. Very few plants are unicellular, but generally a number of cells unite to form a single organism, each cell contributing to the life of the whole. In such a case the shape of the cell usually becomes modified by surrounding influences, together with the pressure of the sap within.

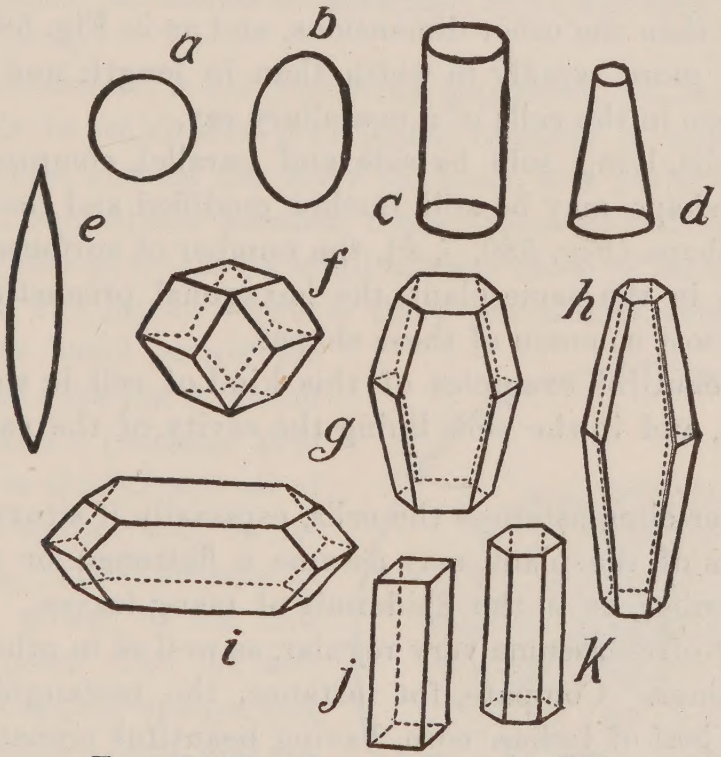
FIG. 579.—Crystals of Oxalate of Lime, from Rhubarb.

Free cells, unicellular plants, or spore cells are usually round. The cells in very young and succulent parts also are generally round or oval (Fig. 580, *a*, *b*); but as the parts grow they be-

come flattened by the pressure of adjacent cells, and accordingly, as this pressure is exerted in all directions equally, or in some directions more than in others, we find a great diversity of form.

Perhaps the simplest modification of the round or oval form is found in cells which are joined end to end, and become flattened at the contact surfaces, but not being compressed in any other direction remain round, and by elongating during growth become cylindrical (Fig. 580, *c*). Such a condition of growth is seen in many of the lower algæ, which consist of a number of cells united into thread-like structures, or in many of the trichomes or vegetable hair.

Or we may observe these cells in tissues which grow rapidly in one



FIGS. 580–590.—Forms of Vegetable Cells.

direction and are subjected to little pressure in the other directions, as in the pith of sunflower, in the parenchyma of sarsaparilla, or in the cells of which ducts are composed, as in the ducts of glycyrrhiza.

Cylindrical cells can of course only be formed if there is no lateral pressure, or if, as in the ducts, the cell-walls are too hard to yield to the pressure of the surrounding soft parenchyma cells, for if sufficient lateral pressure is exerted the cells become changed otherwise in form.

Instead of being perfectly cylindrical the cell may taper toward one or both ends, becoming conical (Fig. 580, *d*) or spindle-shaped (Fig. 580, *e*).

If the cells in the interior of young parts are originally round, or nearly so, they will be in contact with twelve other cells, just as a cannon-ball in the interior of a pile of such spheres will be in contact with

twelve other balls. If all of these cells grow equally in all directions, each one will become polyhedral or many-sided, assuming more or less perfectly the form of a regular dodecahedron (Fig. 580, *f*), met with in some piths and soft parenchyma.

But it is oftener the case that the growth will be more rapid in the direction of the axis of growth, thus elongating the cell, and as a lateral pressure is also exerted, the cells assume polyhedral shapes, more or less perfectly, in the form of rhombic dodecahedra, as shown in Fig. 580, *g*. This is a very common form of pith and parenchyma cells ; and in a transverse section such cells appear hexagonal. As the rapidity of growth in length bears different ratios to the rate of lateral growth these forms may be varied, as in Fig. 580, *h*, in which the length increased faster than the other dimensions, and as in Fig. 580, *i*, in which the cell grew more rapidly in width than in length and thickness, as may be the case in the cells of a medullary ray.

If long cells, lying side by side and parallel, compress each other laterally, the shape may be still further modified and the cells become prismatic in shape (Fig. 580, *j*, *k*), the number of surfaces of the prism varying often in the same plant, the hexagonal prismatic form being, perhaps, the most common of these shapes.

We see beautiful examples of this kind of cell in the scalariform ducts of ferns, and in the cells lining the cavity of the carpels of star-anise.

Under other circumstances the cells, especially if situated in the superficial layers of the plant, may assume a flattened or tabular form, as in cork or suber, or in the epidermis of many leaves. In the latter structure they often assume very regular, as well as in others, extremely irregular outlines. Compare, for instance, the rectangular epidermal cells from the leaf of Indian corn, having beautiful crenate margins, or the cells of the cuticle of the onion scale, with the very irregular cells on the under side of the leaf of Lettuce.

We find similar epidermis cells in organs which are morphologically of the nature of leaves, as in the rind of the water-melon, in which the cells are of a more or less regular hexagonal form.

Cells may be extremely elongated, as in the fibre of cotton, which makes a beautiful object for the polariscope when mounted in balsam. Sometimes the cells are elongated, and at the same time pointed at the ends (fusiform), as in the bast-cells of many barks, or in most wood-cells.

Cells may also be star-shaped (stellate), as in the interior of the stalk or petiole of the water-lily, or irregularly branched, as in the white and spongy parenchyma of the orange peel or in some of the bast-cells.

But a variation in form is not the only change the cell-wall may un-

dergo. Young cells have a thin wall of cellulose, and in some of the lower plants, like in algæ, etc., as well as in some structures in higher plants, this thin wall remains permanently so. In other cases the cell-wall undergoes a thickening and is changed to *lignin*, a tough and hard deposit which gives great strength to the cell-wall, as occurs in the woody cells which serve as mechanical support to the plant, or the thickening may be caused by the deposit of a peculiar substance, called *sclerogen*, on the inner surface of the cellulose.

A difference between this last substance and lignin or cellulose is shown by the polariscope, the sclerogen polarizing light, while lignin and cellulose do not. Transverse sections of bast-cells of cinchona, as they appear under the effects of polarized light, are seen in Figs. 576–578, *a*.

Sclerogen, however, is not uniformly deposited, but numerous small spaces are left in which the protoplasm remains in contact with the original cell-walls, and as the layer thickens, and perhaps layer after layer is added, one within another, these spaces continue to occur in corresponding places, so that a small tubular canal or duct is left, passing through all the layers wherever there was a deficiency in the first deposit. These small canals are best seen if the cells are mounted dry in thick balsam (without previous soaking in alcohol and oil of cloves) so that the air may be retained in them. The difference in the refractive power of air and balsam is so great that the air-filled canaliculi appear opaque and black by transmitted light, and are very distinct, while those filled with balsam can scarcely be perceived.

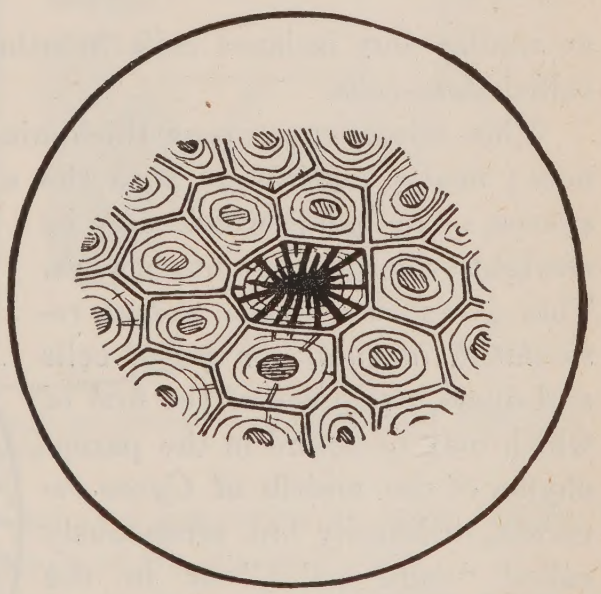
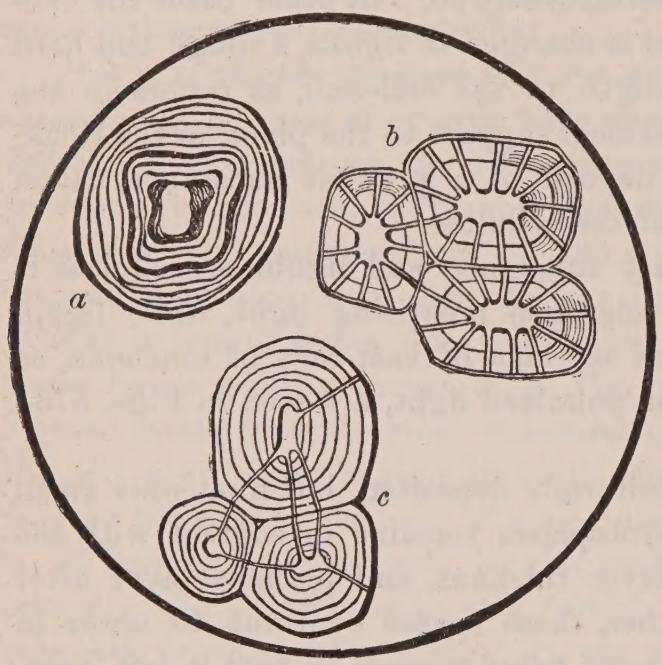


FIG. 591.—Sclerenchyma Cells from Carpel of Star-anise; one filled with air; enlarged.

In Fig. 591 we have represented transverse sections of sclerenchyma cells from the carpel of star-anise, one of the cells being filled with air, the others with balsam.

Usually such a small canal is formed in one cell, just opposite another duct in the adjacent cell, so that only the original cell-walls separate the contents of the cells from each other and osmosis may still go on. This is shown in the sections of bast-cells of cinchona (Fig. 592 *c*) and stone-cells of Ceylon cinnamon (Fig. 592 *b*). Sclerogen is practically impervious to moisture, and communication between the cells

would be cut off if these small canaliculi were not present. In some cases these thin layers of the primary cellulose cell-wall may be absorbed or disappear, and one cell opens into another by pervious small ducts.



FIGS. 592–594.—Sclerenchyma Cells, enlarged. *a*, from Dittany; *b*, from Ceylon Cinnamon; *c*, from Cinchona.

Beautiful sclerenchyma cells may be found in dittany root (Fig. 592 *a*) or in the gritty particles in the flesh of the pear (Fig. 595); or such thickened cells may be isolated, by the process already described, from the bast of various barks, especially cinchonas, or from the wood of the Royal Palm of Cuba (*Orodoxia regia*), etc.

The cells of the stones of fruits are examples of sclerenchyma cells, and they, as well as similar but isolated cells in other tissues of the plant, are often called *stone-cells.*

This sclerenchymatous thickening may take place in various manners; nearly continuous, with the exception of small circular or oval spaces, or in bands which may be straight or spiral, or in other ways. This gives rise to the *dotted, reticulated, annular*, or *spiral* cells and ducts, examples of the first of which may be found in the parenchyma of the midrib of *Cycas revoluta*, ordinarily but erroneously called "sago palm," or in the parenchyma cells of areca nut.

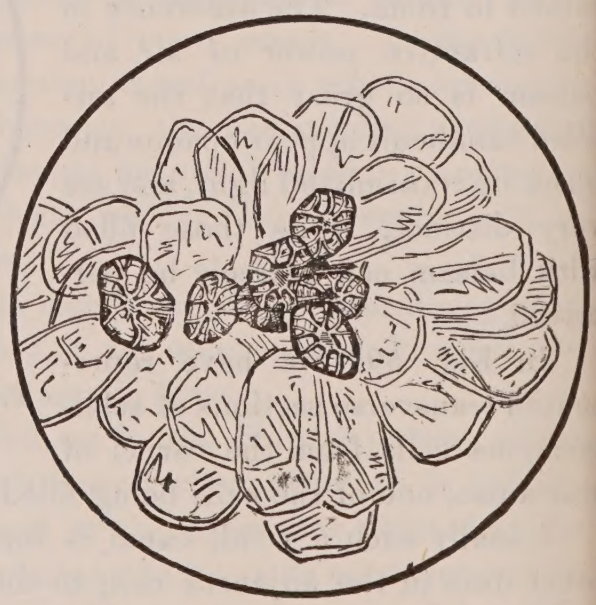


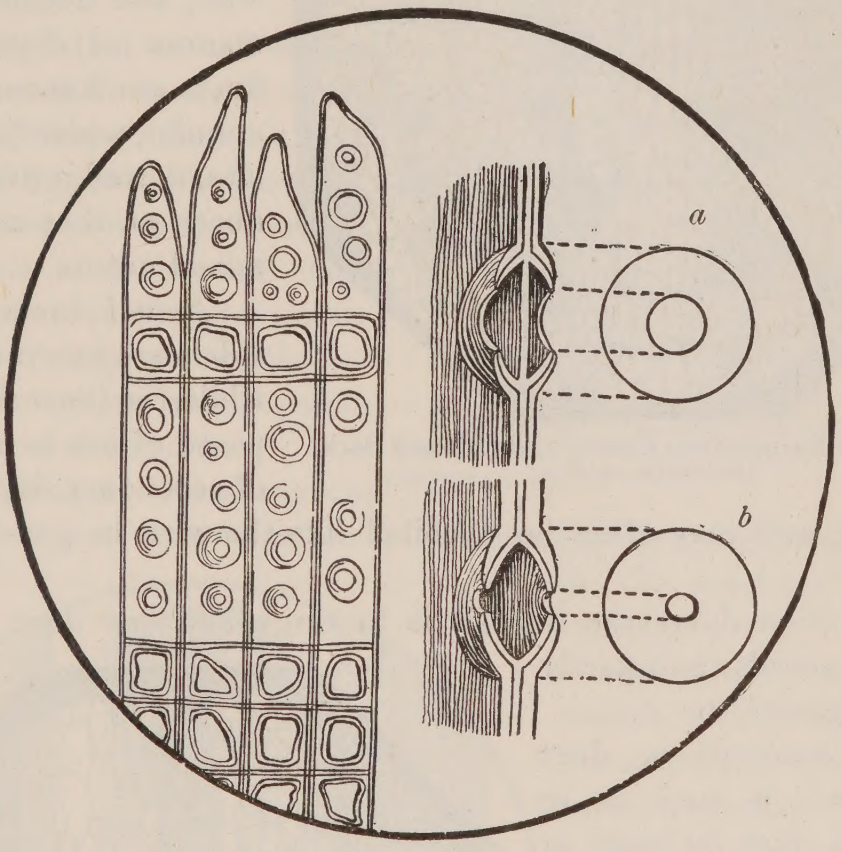
FIG. 595.—Sclerenchyma Cells from Gritty Particles in Pulp of Pear, magnified.

We can also find beautiful examples in the ducts of the woods of various drugs, guaiac, logwood, fernambuco, quassia, or in various roots or rhizomes, as in glycyrrhiza, arnica, taraxacum, sarsaparilla, etc.

Peculiar round dots or pores are found in the wood-cells of conifers, which are characteristic of that class of plants, and which are shown in

the drawing of wood-cells of *Pinus sylvestris* (Fig. 596) ; the thickening of the cell-wall at first leaves a larger circular space, but this gradually becomes narrowed until we see the appearance as in *a*, a section of the cell-walls being also shown. At *b* we see an older formation, in which the opening is more contracted, but the original cell-wall is absorbed and free communication established between the cells. Cells of this kind are termed *pitted* cells.

Parallel bands of sclerogen may be found, as in the annular ducts of



FIGS. 596–598.—Pitted Wood-cells of Pinus Sylvestris ; *a*, younger, and *b*, older pits, enlarged.

the vine or pumpkin vine, while spiral ducts occur in many plants, as in rhubarb or ginger, or in the petiole of the plantain leaf.

Sometimes two, three, or more bands lie side by side to form the spirals, and when the delicate cellulose wall is torn these spirals may often be completely unravelled.

The distribution of sclerenchyma cells among the soft-walled cells often gives the peculiar appearance which characterizes certain drugs, and materially aids us in recognizing them under the microscope, as is shown in the sections of cinchona bark (Figs. 599 and 600).

Sometimes large sclerenchyma cells unite end to end, and then the septa are absorbed entirely or in part, thus forming continuous passages for some distances. These are the so-called *ducts*, *vessels*, *tracheïdes*, or

spiroids, the first name being the most common. The last name should be applied only to ducts formed of spiral sclerogen bands which can be unravelled, the other varieties of ducts being designated as *spurious spiroids*.

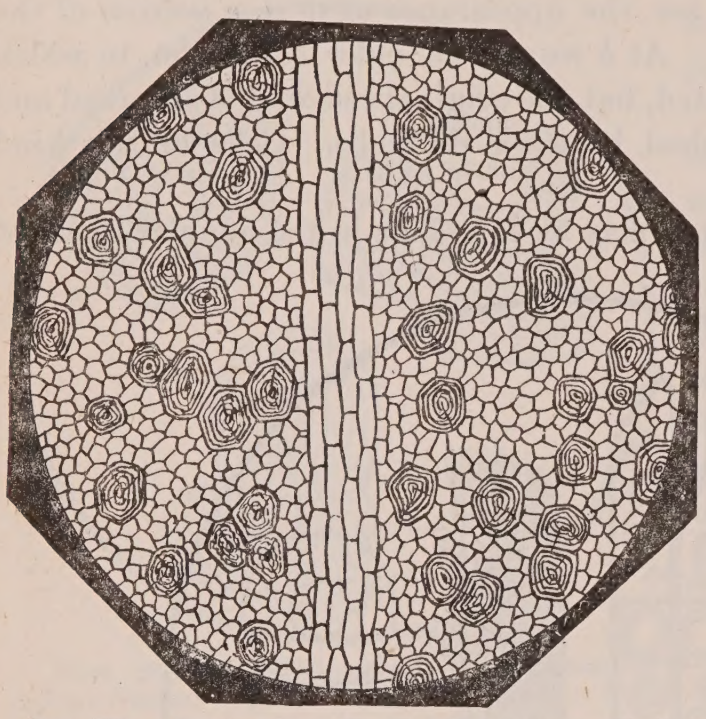


FIG. 599.—Portion from Cast of Old Calisaya Bark, transverse section.

The sclerogen in these cases is deposited in the interior of the original cell-wall, and according to its manner of deposition the ducts are known as spiral, annular, scalariform, reticulate, dotted, pitted, or sieve ducts, or they may be of a mixed nature.

Spiral ducts consist of a delicate external cell-wall, while the inner wall is composed of one or more bands of secondary deposit which are coiled, and may often be uncoiled like the wire in gas-tubes (Fig. 601 *e*).

In *annular* ducts the deposit is in rings, and one duct may often be partly annular and partly spiral (Fig. 601 *a*).

In a *scalariform* duct the deposit is such as to cause the duct to more or less perfectly resemble a ladder with its spokes (*scala*, a ladder), as we see in Fig. 601 *i*, or in Fig. 604 *e*.

Reticulate and *dotted* ducts differ but little. In the first the spaces in which there is no deposit of sclerogen are a trifle longer in a transverse than in a longitudinal direction and are fusiform, giving the appearance of a network (*reticulum*) of sclerogenous deposit (Fig. 604 *a*), while in the dotted duct the spaces are round or oval (Fig. 604 *i*).

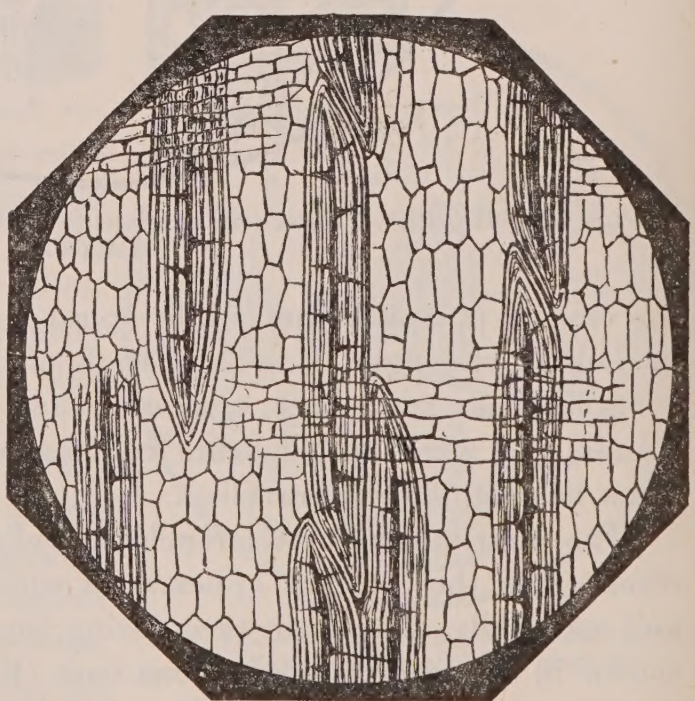
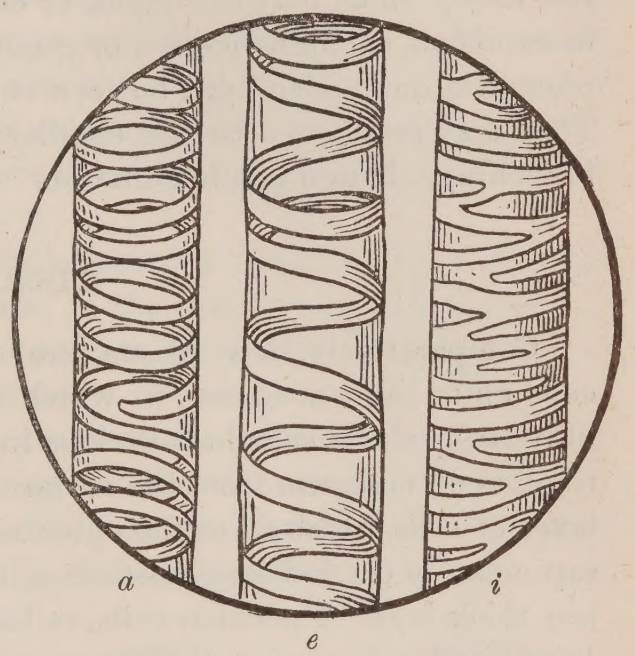


FIG. 600.—Bast-cells from Cinchona Calisaya, radial section.

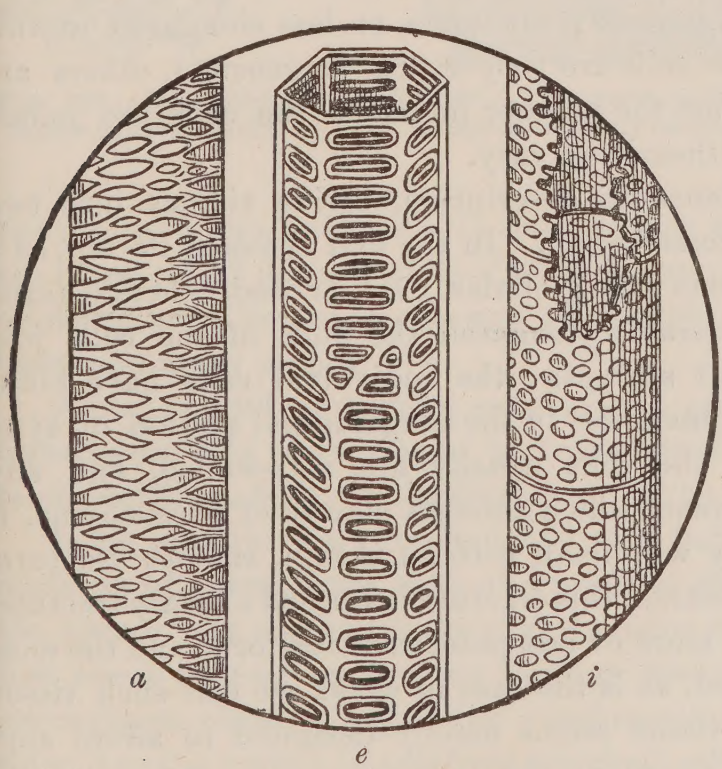
Sieve ducts are ducts in which the septa have pores which afterward are perforated, or where the whole wall thickens uniformly except where one cell of the duct touches another, when the surfaces of contact are perforated or thickened so as to present appearances more or less resembling sieves. Such ducts and cells have also been called *latticed.*

The *pitted* duct or cell resembles the dotted duct or cell in its appearance, but differs in the manner of deposit of sclerogen, as the pores are larger in the first deposit and become narrowed in subsequent layers, contracting gradually toward the interior of the cell, as we have seen in the cells of the conifers.



FIGS. 601–603.—*a*, Mixed Annular and Spiral Duct; *e*, Spiral Duct; *i*, Scalariform Duct; all magnified.

These different ducts contain air when old, and are therefore called *tracheïdes*, resembling, as they do, the tracheal vessels of insects.



FIGS. 604–606.—*a*, Reticulate Duct; *e*, Scalariform Duct of Fern; *i*, Dotted Duct, upper part torn.

In connection with the cuticle or hypoderma covering certain plant structures, peculiar cells are sometimes formed in which the thickening takes place excessively in the angles where the cells meet, and by a peculiar substance which causes the cell-walls to swell and become mucilaginous in water, and such cells are called *collenchyma* cells, and tissues composed of such cells are *collenchymatous* tissues (*colla*, glue).

The *laticiferous ducts* or *vessels* are also formed by the coalescence of cells, and may occur in the fibro-vascular bundles

or in the fundamental tissue, being most commonly found in the phloëm portion of the bundles. Their walls are generally thin and they contain the *latex*, which may be limpid, or oily or resinous substances with gum in emulsion, caoutchouc-like, or gummy. These vessels often form complex anastomoses and can be seen very finely in the root of Taraxacum. They may be likened to the capillary blood-vessels of animals in their branching, though not in function.

TISSUES.

Comparatively few plants are unicellular; in the larger number cells unite to from *tissues*, in which many cells (often untold millions) unite to perform certain functions in common. For instance, to prevent the loss of moisture from the surface of a stem this is covered with a layer of cells which form the epidermis; or, if the stem is large and the sap must be carried long distances, the epidermis develops a more or less thick layer of peculiar cells, called cork-cells, together forming *suber* (cork) and performing the function of preventing evaporation of the liquids while in transit.

As we have already learned, cells are changed in shape by the pressure of adjacent cells, and as least pressure is exerted in the direction of most rapid growth they generally are more or less elongated in this direction. But while some cells are very much lengthened, others are less so, and at the same time the manner in which the cells are joined to those above and below them may vary.

We may, for convenience in description, divide tissues into two kinds, *parenchyma* and *prosenchyma*. In the first the cells do not, as a rule, depart very much from the globular, oval, or dodecahedral form, and even if they are considerably elongated the ends of the cells join each other by abrupt or flat surfaces; the individual cells have blunt ends, as is well shown, for instance, in the longitudinal section of symphetum. In parenchyma the cells usually are soft-walled, and any structure, as a root or rhizome, which consists mainly of parenchyma, is called *fleshy*, and when dry will break with an abrupt, smooth fracture. If the part contains much starch, this fracture is termed a *mealy* fracture.

But when the cells are more or less pointed or fusiform, and the ends are interlaced or dove-tailed, as is the case in wood, we call such tissue *prosenchyma*, and as this tissue seems mainly designed to afford support to the softer parts of the plant, the cells composing it are usually sclerenchymatous or lignified. Parts of plants mainly composed of this kind of tissue are said to be *woody*, and they break with a *fibrous* fracture.

When the cells lie in close apposition their cell-walls usually unite so completely that they appear to be one. If the cells are not everywhere in contact they leave *intercellular spaces*, and these spaces may be of regular or irregular form, for no apparent object, or to fill certain functions. The simplest spaces are the small spaces which appear triangular, in transverse sections of sarsaparilla, for example (Fig. 607). Such spaces occur when the cells are round or cylindrical, without much lateral pressure.

Another larger form of intercellular space is found in the submerged parts of aquatic plants ; for instance, in the rhizomes of menyanthes or calamus, or the stems or petioles of calla or water-lily. Such structures, when dry, break with a *corky* fracture.

The intercellular spaces may anastomose, producing a system of pseudo-ducts, which may be filled by sap, or the spaces may contain gum, resin, or oil, or all of these. Such spaces occur in the leaves of buchu, eucalyptus, or pilocarpus, the rind of the citron or orange, or in

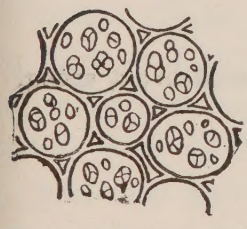


FIG. 607.—Intercellular Spaces in Sarsaparilla.

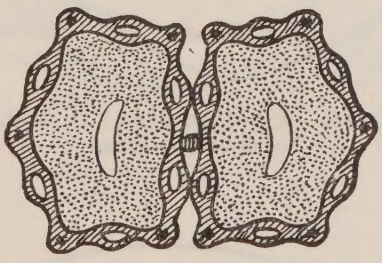


FIG. 608.—Transverse Section of Caraway, showing oil-ducts.

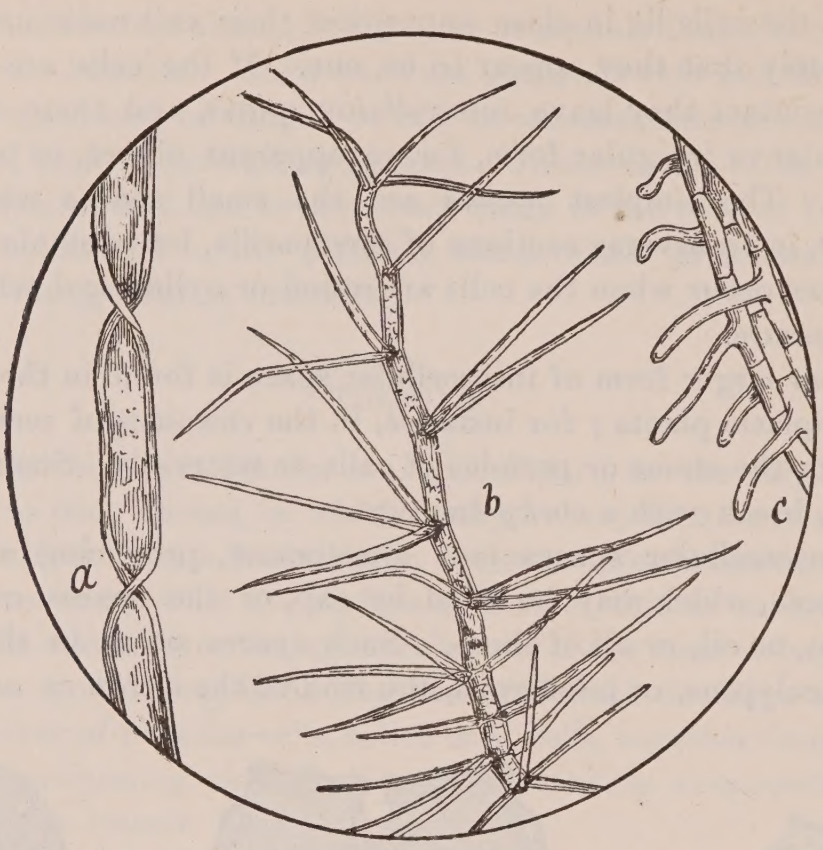
FIG. 609.—Jaborandi Leaflet, by transmitted light.

the juniper-berry or clove. If these spaces are more or less round they are often called *glands*, while if they are much elongated they are called *oil-ducts*, as in fennel or caraway (Fig. 608), or *resin-ducts* in the coniferæ and other plants.

A leaf or rind containing such glands appears to be studded with translucent dots when viewed by transmitted light, as is seen in jaborandi leaf (Fig. 609), or the fresh peel of the orange.

If we examine the succulent end of a fast-growing rootlet we find it made up of parenchyma cells of a uniform character. But a little above the apex of the rootlet, in the slightly older part, we find cell-differentiation already going on to form various tissues. This original uniform parenchyma tissue is called the *fundamental tissue*, and we may consider it as the matrix in and from which all other tissues have their origin.

One of the first and most frequently observed changes occurs in the outside layer or layers, in which the cells become smaller and flatter, while their walls thicken and become more impervious. Even in algæ



FIGS. 610–612.—Vegetable Hairs. *a*, cotton fibre; *b*, branched hair of mullein; *c*, spongioles of rootlets.

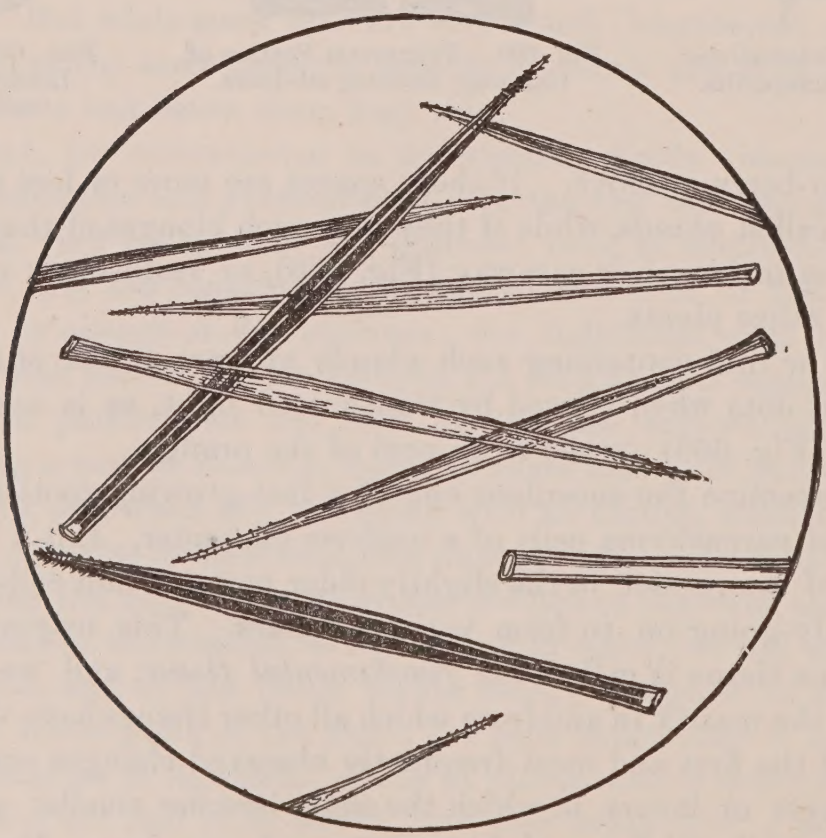


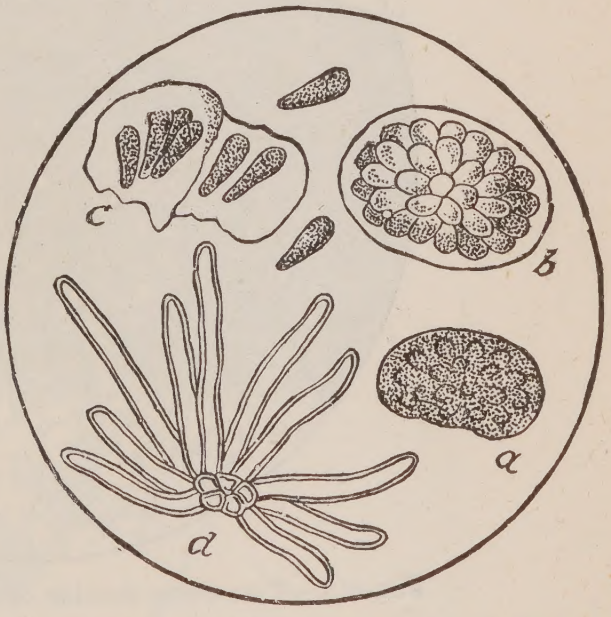
FIG. 613.—Hair of Mucuna.

and fungi, in which little, if any, other differentiation takes place, some sort of cuticularization occurs, and the thallogens are completely made up of fundamental tissue and this cuticle.

Tissues made up of these outer cells are the *epidermis* or *epidermal tissue*, which we can well study in such parts as leaves or fruits.

As the stem or root acquires considerable thickness the epidermis usually is torn and lost, and another tissue takes its place. We have already spoken of *cork* or *suber*, and will have to refer to it again; when the epidermis is gone it forms the outer layer of the bark of dicotyledonous and gymnospermous plants, as well as the outer layer of the cuticle of monocotyledonous plants.

From the epidermis may arise various structures, which are called *trichomes*. In the small rootlets the outer cells are prolonged into small hairy processes, the *spongioles* (Fig. 610 *c*), which absorb the moisture from the soil. On the epidermis of parts above ground we often find hair composed of one or more cells. We show enlarged figures of cotton fibre (Fig. 610 *a*), of the *simple hair* of mucuna with its barbed point (Fig. 613), the *stellate hair* of kamala (Fig. 614 *d*), and the hair of mullein, the latter being a beautiful specimen of *branched hair* (Fig. 610 *b*). Sometimes the trichomes are flattened, appearing like *scales*. The filament of Tradescantia virginica, a common garden and wild flower, is covered with some of the most beautiful of all vegetable hairs, resembling strings of blue beads. Many of the vegetable hairs exhibit the phenomena of cyclosis.



FIGS. 614-617.—Hairs and Glands of Kamala.

The prickles of the rose-bush (Fig. 618) and of other plants are but trichomes or outgrowths of the epidermis, due to a proliferation of epidermal tissue, something like a wart on the skin of an animal. Sometimes trichomes assume still other shapes, as in kamala (Fig. 614 *a*, *b*, *c*), lupulin, etc., forming *glands*, which are, however, essentially different from the glands consisting of large intercellular spaces. Another form of trichomes is found in the *stomata* or breathing-pores of leaves, of which we will speak when describing leaves.

If we make a transverse section a short distance above the point of the growing rootlet of *Ricinus communis* (Fig. 619 A) we find a differen-

tiation going on at several points in the interior, which finally coalesce in such a manner that a ring of generating tissue (*meristem*) is formed, which divides the thickness of the root into two portions, an inner portion of parenchyma, which will afterward form the pith, and an outer zone which afterward forms the middle bark. These points develop into *fibro-vascular bundles*, structures which we find in all phanerogamous or flowering plants, as well as in the acrogens, or that subdivision of cryptogams in which there is found a distinct division of root, stem,

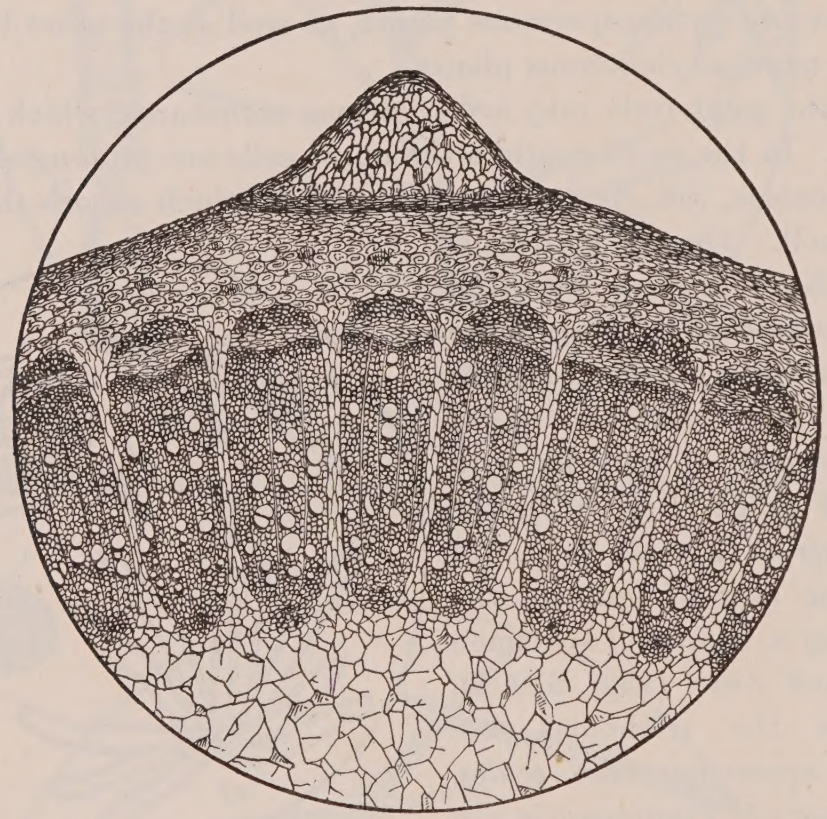


FIG. 618.—Transverse Section of Rose-twig, showing the Prickle.

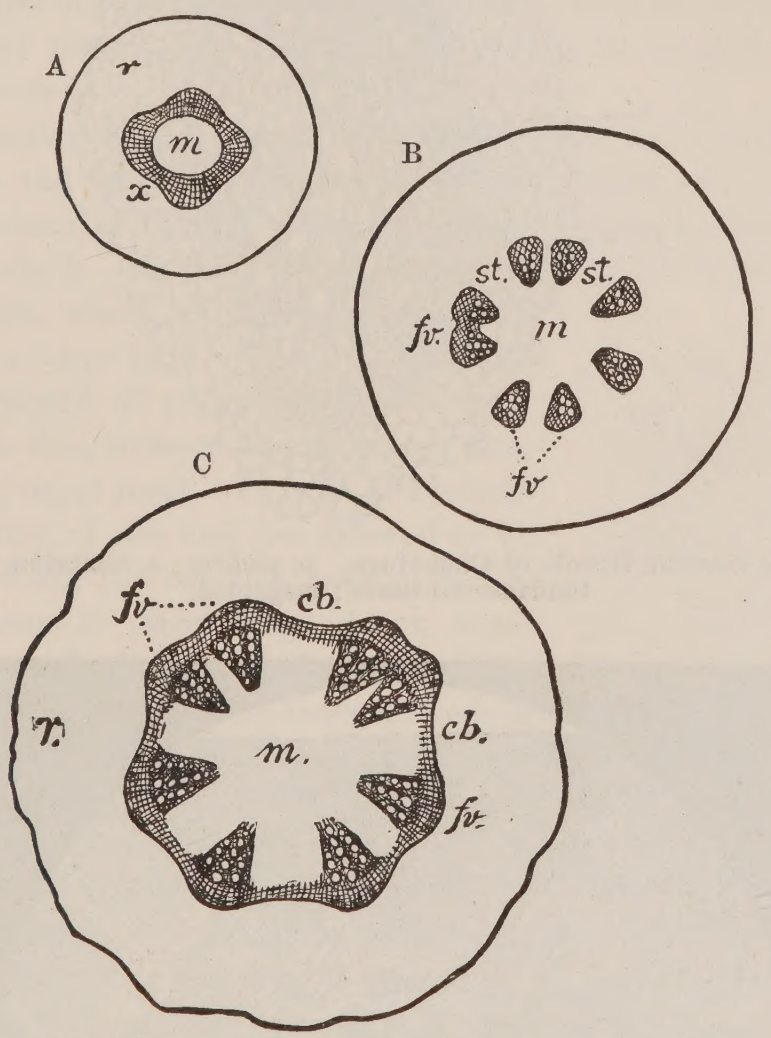
and leaf. In Fig. 619 B the fibro-vascular bundles (*fv*) are represented as somewhat more advanced in development. They are, however, connected by bands of generating tissue (*secondary meristem—cb*), which are shown in Fig. 619 C, and which are capable of producing new fibro-vascular bundles.

The *fibro-vascular bundles* are string-like masses of tissue passing through the soft tissues, consisting mainly of prosenchyma and ducts.

Usually they are so intimately united with the parenchyma that they cannot be separated therefrom; but in some cases their string-like nature may easily be shown, as in plantain (*Plantago major*) leaves or petioles. By breaking the petiole or ribs of this leaf carefully, and pulling apart, little threadlike fibres, often several inches in length, may be drawn out,

and will be seen under the microscope to consist of spiral ducts and fusiform cells.

To examine the nature of the fibro-vascular bundles we may make a transverse section of the rhizome of cimicifuga in which we find a large number of such bundles of various sizes. Choosing for our examination one of the larger and more fully developed bundles (Fig. 622), we find that it is made up of three parts, an inner part called *xylem* or *wood*,



FIGS. 619–621 (after Sachs).—Sections of Rootlet of *Ricinus Communis*. A, after the appearance of root beyond testa of seed; B, after the hypocotyledonary segment has attained a length of about 2 centimeters; C, at the end of germination; *m*, pith; *r*, middle bark; *x*, meristem; *st*, medullary rays; *fv*, fibro-vascular bundles; *cb*, connecting bands of secondary meristem.

an outer part called *phloëm* or *bast*, and between them a part composed of very soft parenchyma cells, constituting the *cambium*.

The relation of these parts to each other, or to the surrounding tissues, may vary in different plants; or one or the other of these tissues may be entirely wanting.

Xylem or wood usually consists of ducts and prosenchymatous cells,

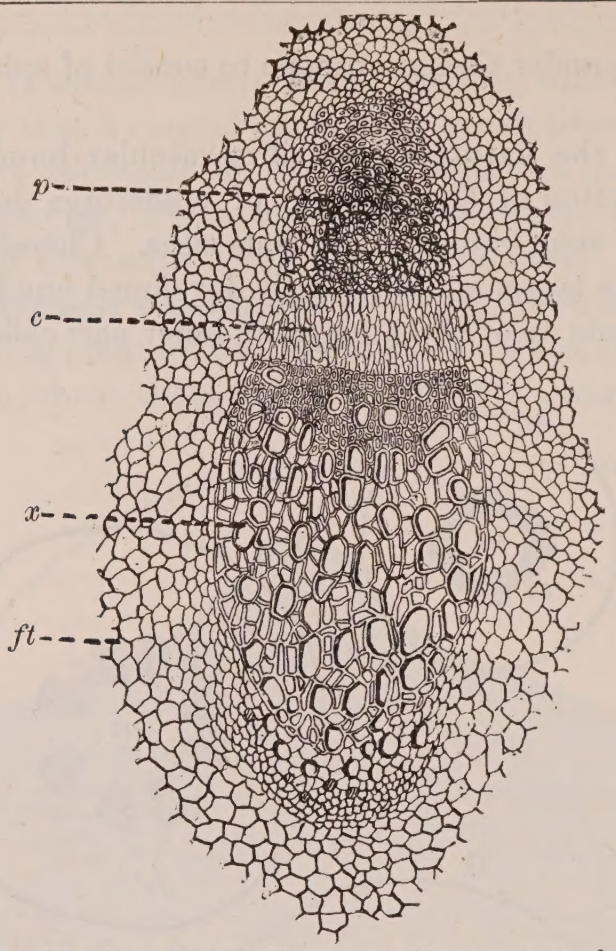


FIG. 622.—Fibro-vascular Bundle of Cimicifuga. *p*, phloëm; *c*, cambrium; *x*, xylem; *ft*, fundamental tissue; magnified.

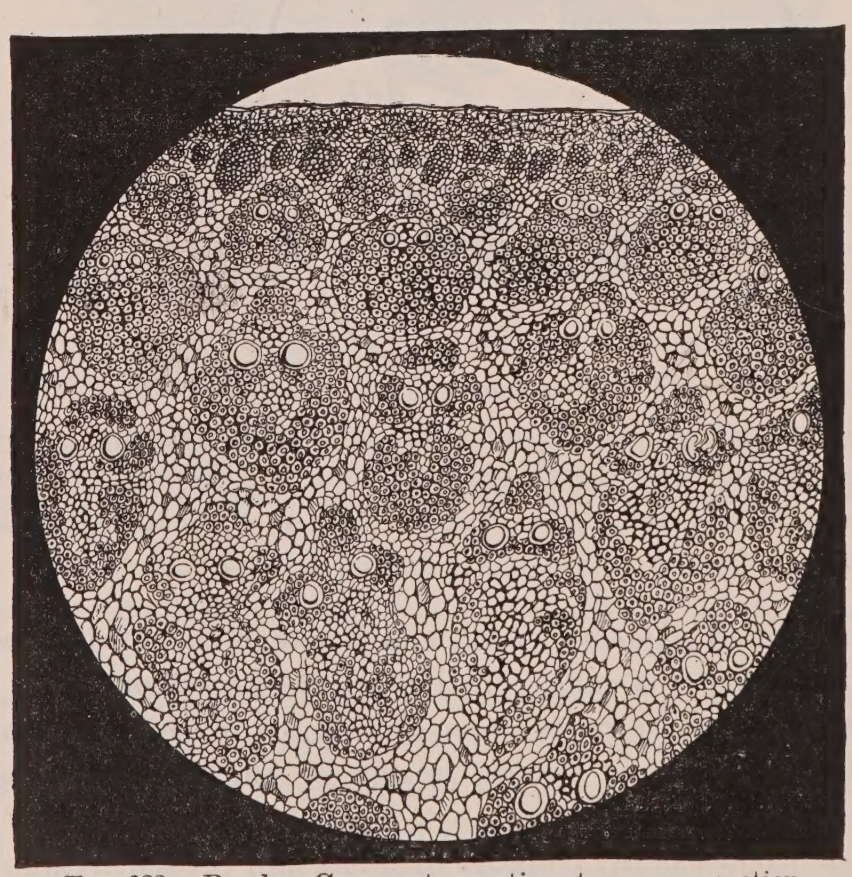


FIG. 623.—Bamboo Cane, outer portion, transverse section.

the latter the so-called *wood-cells.* These latter cells have a strong tendency to lignify, and in the older formations usually contain air.

Phloëm consists of soft-walled cells, with the exception of "bast-cells," which are sclerenchymatous. Bast-cells may occasionally be absent entirely, but are usually plentiful.

The *cambium* consists of delicate parenchyma cells from which the other kinds of cells are developed.

These different tissues may be studied to advantage in some of the young and growing parts of plants, as in the root of the sprouting seeds, for instance of ricinus, and usually most readily in dicotyledonous germinating plantlets.

Fibro-vascular bundles are of two kinds, *open* and *closed.* We will first consider the latter. In monocotyledonous stems and roots a number of fibro-vascular bundles appear, which possess the characteristics already described. In these stems a cuticle or epidermis is found, and a layer of cells, which, though often called a bark, is not a true bark. The fundamental tissue is composed of parenchyma, and scattered through this, without any apparent plan or regularity, or, at most, in a sort of systematic irregularity, if we may be allowed so to express it, we see the bundles, each of which consists of one or more large ducts, some wood-, bast-, and, while growing, cambium-cells. The bundles are usually more numerous but smaller near the circumference, but do not always lie just beneath the cuticle, being sometimes surrounded by a layer of cells resembling a bark, but which is not separable from the wood as in the case with the true bark of dicotyledons.

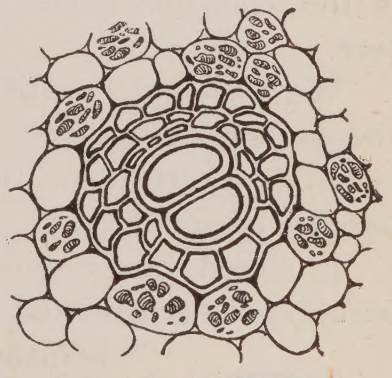


FIG. 624.—Closed Fibro-vascular Bundle of Ginger.

The bundles in the interior of the stem are larger and more scattered. New bundles may be formed anywhere among the others, and usually occur in the soft tissues of the interior, for which reason this method of growth is called *endogenous*, or inward-growing. A beautiful example of this structure may easily be obtained from the stem of sarsaparilla, or in bamboo cane, a section of which latter we have figured (Fig. 623).

In the fibro-vascular bundles of these endogenous stems the cambium, after a time, is all changed either to wood or bast, and then the bundle ceases to grow ; it is *closed* (Fig. 624).

It will be noticed on examination of the section of bamboo cane, that larger bundles farthest from the cuticle, still contain soft-walled cambium-cells, while in the outer bundles all the cells have become liquefied, or the bundles have become closed.

In some cases the bundles, instead of being scattered through the entire interior of the stem or root, are clustered in a circle, the section then imperfectly resembling that of exogenous stems. We see this in the root of sarsaparilla or the rhizome of curcuma, and in many other drugs. The circle of bundles is in these cases often enclosed in a sheath of sclerenchymatous cells, which is called the *nucleus sheath.* This circular layer of cells is also found in some rhizomes in which the bundles are not aggregated in such distinct circles but are scattered throughout the fundamental tissue, both within and without the nucleus sheath, as in curcuma, galanga, or ginger. (See Figs. 476–478, on page 894, and Fig. 221, on page 394.)

Other peculiar and instructive sections of endogenous growth, showing large intercellular spaces, may be made from the rhizomes of calamus, buckbean, or calla.

As the endogenous growth occurs in plants having but one seed-leaf in the seed, this is also called the *monocotyledonous* growth or structure.

We also find beautiful examples of closed fibro-vascular bundles in the higher cryptogams, and in these plants each bundle is often enclosed by a sort of sheath of its own, as can be seen in the fibro-vascular bundles of malefern.

In closed fibro-vascular bundles the cambium usually, if not always, occupies the centre, and the first wood-cells are formed at the periphery, additional wood being formed within the first layer, and so on until all the cambium is gone and its place occupied by wood or bast, so that it is seen that even the bundle itself is inward-growing.

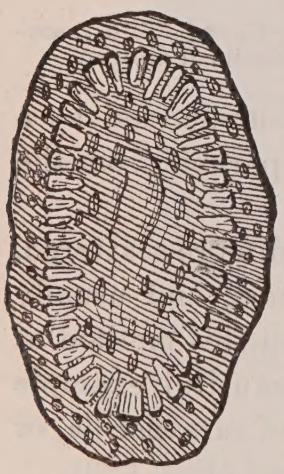


FIG. 625.—Transverse Section of Imperatoria.

Closed fibro-vascular bundles may also be found in some dicotyledonous plants in which growth is limited, for instance in some annual or biennial plants. But in perennial or continuously growing plants the structure is quite different and we find open fibro-vascular bundles.

The relation of the open fibro-vascular bundles to each other and to other tissues may be well seen in a transverse section of imperatoria (Fig. 625) or yellow parilla (Menispernum canadense). In the stem of the latter plant (Fig. 626) we find a number of wedge-shaped fibro-vascular bundles arranged in a circle around an inner mass of parenchyma and surrounded also by parenchyma, while between the different bundles are wedges of parenchymatous tissue separating them but uniting the inner and outer parenchyma with each other. All of

this parenchyma is fundamental tissue, and that portion of it between the fibro-vascular bundles is composed of cells stretched so that the longest diameter of the cells is from within outward, or at right angles to the axis of most rapid growth of the plant, being in this regard exceptions to the general rule. The portion of parenchyma within the circle of bundles is called *medulla* or *pith*, and the portions proceeding from this outward are called the *medullary* rays, while the portion surrounding the bast of the bundles constitutes the *middle bark*.

This relation of the different tissues to each other is also well seen

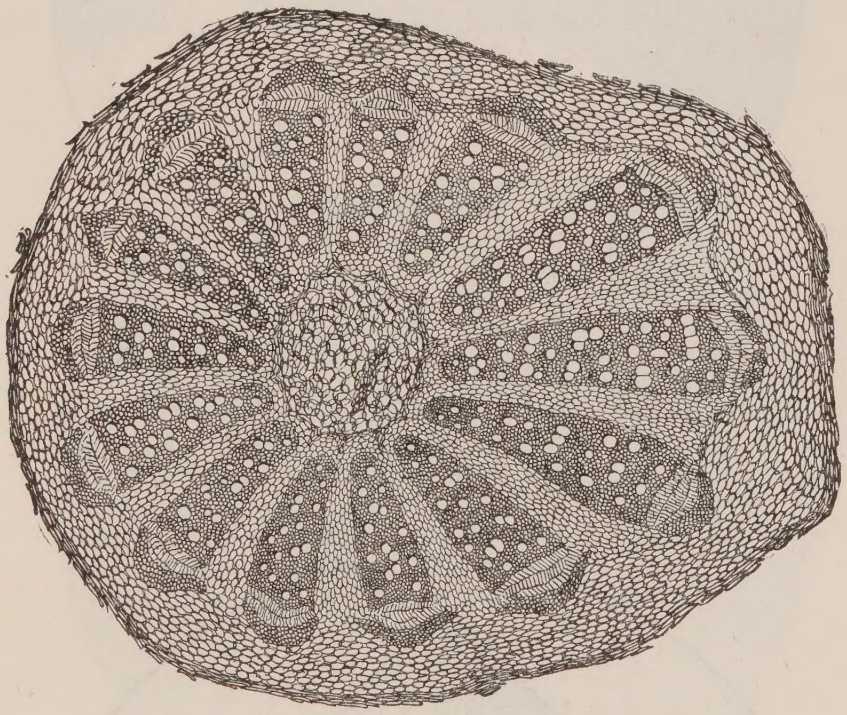


FIG. 626.—Transverse Section of Menispernum.

in a transverse section of a young twig of a rose-bush (Fig. 627). The fibro-vascular bundles are seen to be wider tangentially than they are from within outward, while the medullary rays are quite distinct.

The three parts or kinds of tissue of which the bundles are composed—wood, bast, and cambium—are very distinct. If we examine somewhat older twigs (Fig. 628) we will find the following to have taken place during growth: the cells of cambium next to the wood produced new wood-cells, while those nearest the phloëm formed new bast, so that the fibro-vascular bundles became larger, increasing the diameter of the branch, and at the same time crowding each other more and more. The medullary rays between them are thereby compressed until finally they consist of very narrow layers only.

The change of cambium into phloëm and xylem continues as long as the leaves continue to assimilate food, or, in other words, as long as the

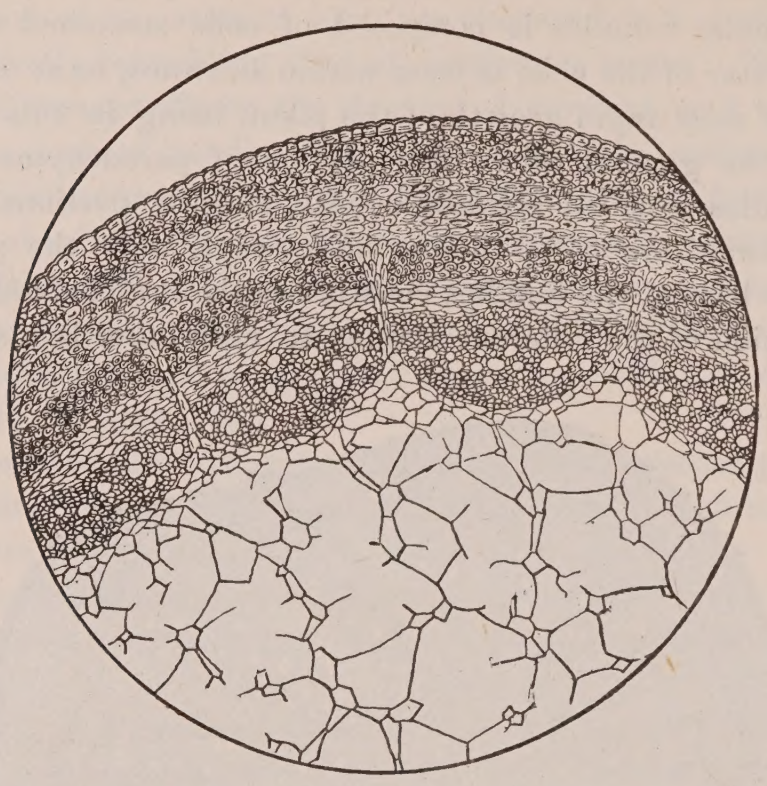


FIG. 627.—Transverse Section of Young Rose-twig.

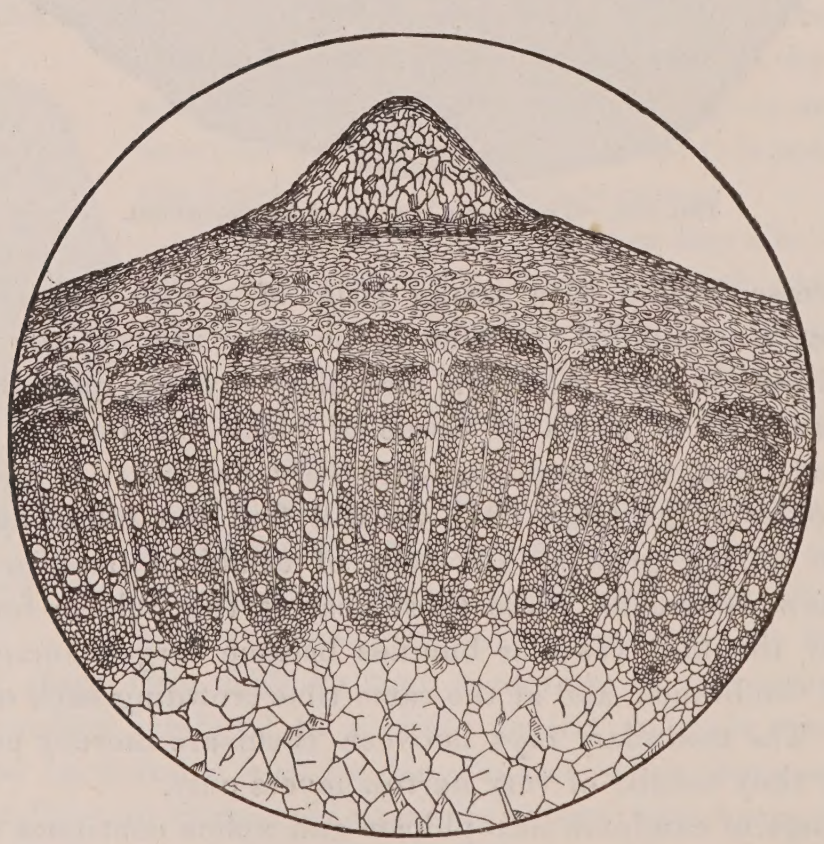


FIG. 628.—Transverse Section of Rose-twig at end of first year.

vegetating process is kept up, which depends on the place where the plant grows, as well as on the seasons, being perpetual in the tropics, where trees are found in which the process probably dates back without interruption to the time of the builders of the pyramids, or farther still, while in sub-arctic regions the process may be confined to a few weeks in each year. In many plants the process is limited to a single season.

When the plant grows during a part of the year only, as in the temperate zone, the fibro-vascular bundles cease to grow at the end of the season. At the beginning of the next season one of the earliest signs of returning activity of vegetation is manifested by a great turgescence of the cambium and of the adjacent cells to such an extent

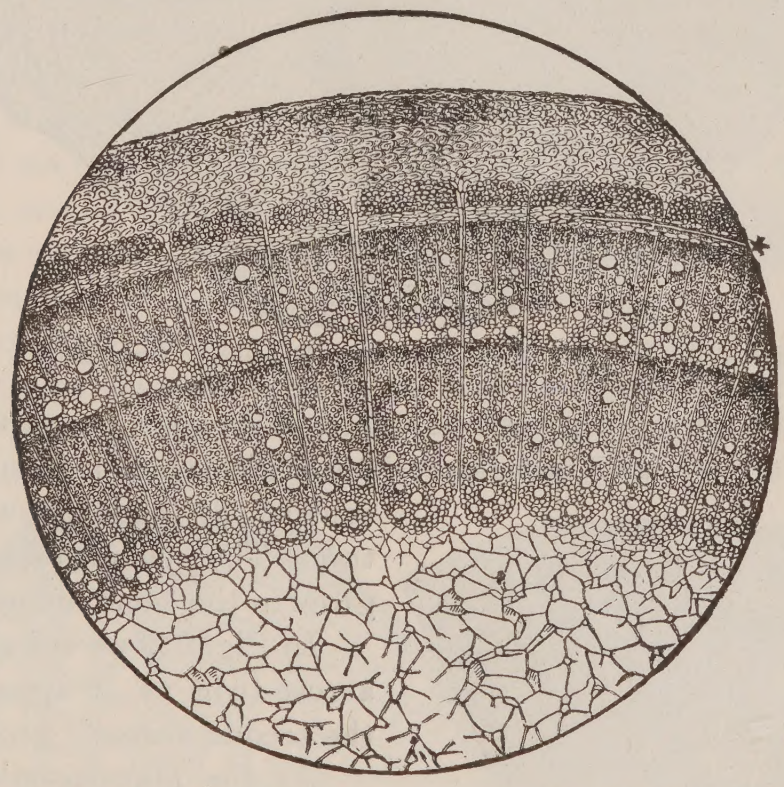


FIG. 629.—Rose-twig, end of second year, transverse section, enlarged. The * indicates the division of wood and bark.

that, if wounded, enormous quantities of sap may escape, as in sugar-maple in early spring.

Then the buds expand, the leaves unfold, and the life of the plant actively goes on. The inner layer of cambium produces large ducts and large wood-cells, and the new wood is added in a ring around the xylem of the first year's growth ; the process continues until, as the season goes on, the leaves harden, the stomata may be filled with dust, the soil contains less moisture, and cell-formation gradually becomes slower and the cells smaller, while ducts may entirely cease to be formed, until finally, when the leaves have fallen the year's work is

completed and another ring of wood has been added to the first. So each year adds a ring of wood on the outside of the growth of previous

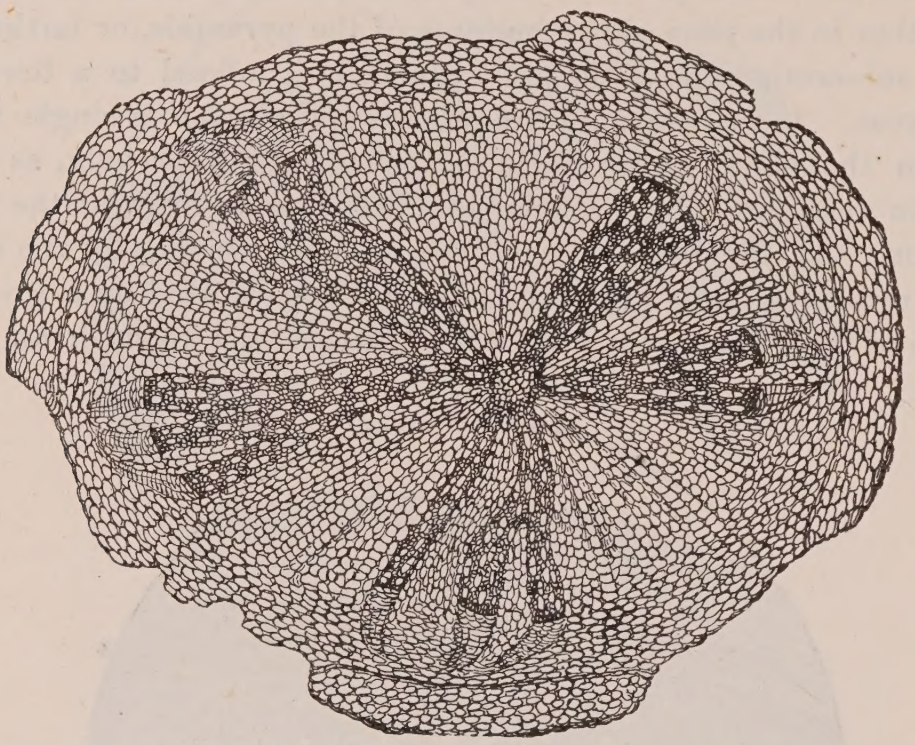


FIG. 630.—Division of Fibro-vascular Bundles in Cimicifuga.

years, and therefore this growth is called *exogenous*, or *outward-forming* or *growing;* or, as it is characteristic of dicotyledous plants, it is also called dicotyledous growth or structure. The gymno-spermous plants grow in the same manner.

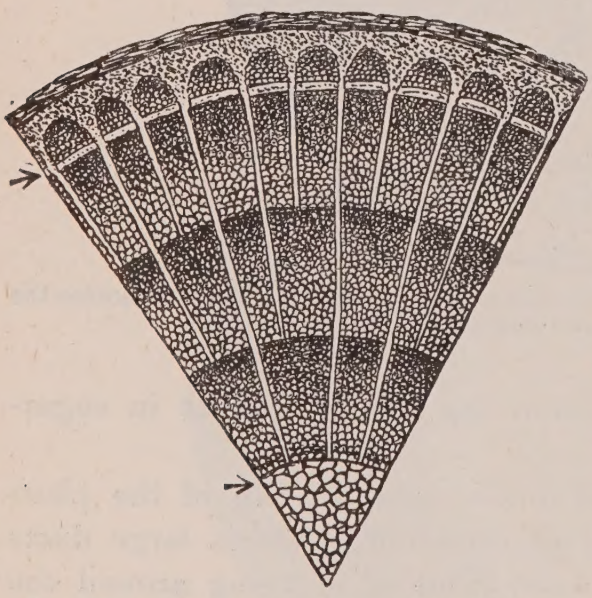


FIG. 631.—Diagrammatic Section of Dicotyledonous Stem of three years' growth. The upper arrow indicates the cambium, and the lower arrow the medullary sheath.

In Fig. 629 we see a portion of a rose-twig as it appears during the second season's growth.

As the fibro-vascular bundles grow wider at the outer side as the diameter of the stem or root increases, they do not always remain as one bundle, but divide either during the season's growth, as illustrated in the section of cimicifuga (Fig. 630), or at the beginning of the next season, as shown in the diagram of a section of oak (Fig. 631).

As ordinarily a ring of wood is added each year, as the process takes place around the entire circumference of the stem or root, these rings

are called *annual rings*, and they are characteristic of wood-growing in temperate zones. By counting these rings the age of a tree may be approximately ascertained, but not exactly, for any interference with the growth during any season, as by drought or severe cold, may give rise to two or more rings in one year.

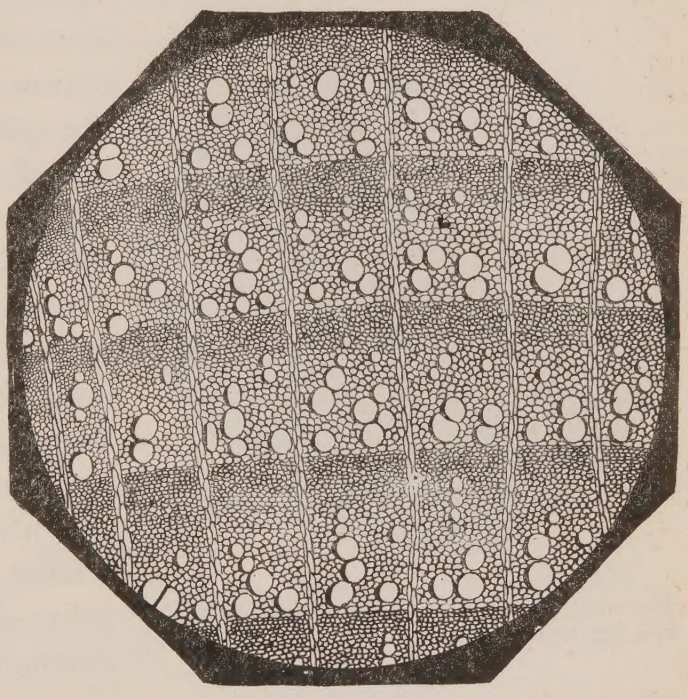


FIG. 632.—Wood of Sassafras Root, showing Annual Layers.

The rings are generally easily distinguished, because in the earlier part of the season, while growth is very active, a larger number of ducts and larger wood-cells are formed, while toward the end of the season the ducts are fewer in number and the wood-cells smaller (Fig. 632). Even in woods in which no ducts are found the difference in the size of the wood-cells makes the rings quite distinct (Fig. 633).

In tropical climates vegetation continues more or less actively all the year round and the layers are not concentrically continuous. They are then called *spurious rings*, as in the stem or root of false pareira brava (Fig. 634), in a section of which, by tracing from the point "*sp*" toward the left, one layer will be seen to have been deposited in a threefold spiral, while other layers are less than one-half the circumference in length.

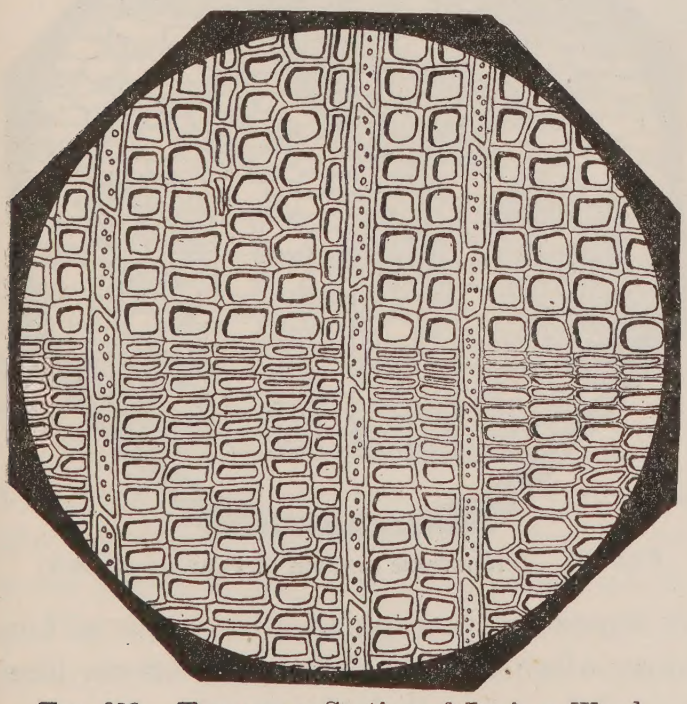


FIG. 633.—Transverse Section of Juniper Wood.

Wood continues to conduct sap for a few years and then the cells either become empty or filled with air, or they become filled with various substances, usually giving them a dark color. They serve then only for support and are called *heart-wood* or

duramen. The living part of the wood, therefore, may consist simply of a thin shell of soft cells which conduct sap, and this wood is usually light-colored, and is known as *alburnum* or *sap-wood.* The line of demarcation between these woods may be abrupt when each year one layer is added to the circumference of the sap-wood and at the same time the inner layer of sap-wood is changed to heart-wood, or the latter process is not completed in a single season and the demarcation is gradual. We may see good examples of these two kinds of wood in red cedar (red and white), ebony (black and white), walnut (brown and white), guaiac (olive-green and white), and in other common woods. In some stems the alburnum and duramen both are white, as in white pine.

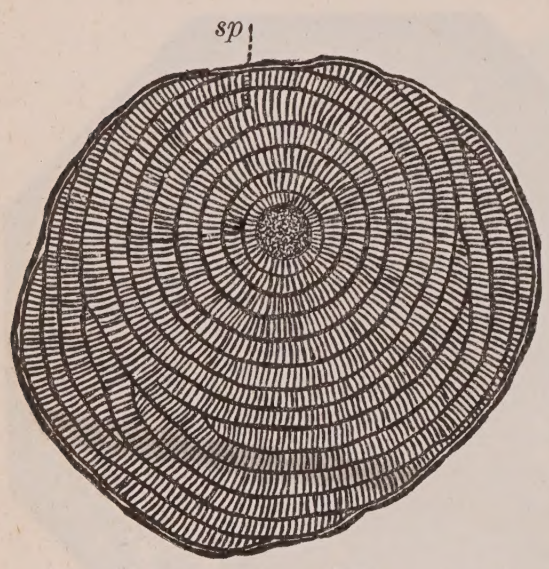


FIG. 634.—Spurious Rings in False Pareira. *sp* shows beginning of spiral by tracing to the left; natural size.

But while a layer of wood is added by cell transformation from the inner side of the cambium, the outer side of cambium adds also bast to the inner side of the older phloëm, so that, strictly speaking, we also have endogenous growth of the bark in dicotyledonous growth. The new bast is not always added in distinct layers, but irregularly, as in cinnamon (Fig. 635), or a number of layers are formed in a single season, as in cotton-root bark (Fig. 636), so that it is impossible to determine the year's growth from the appearance of the bark.

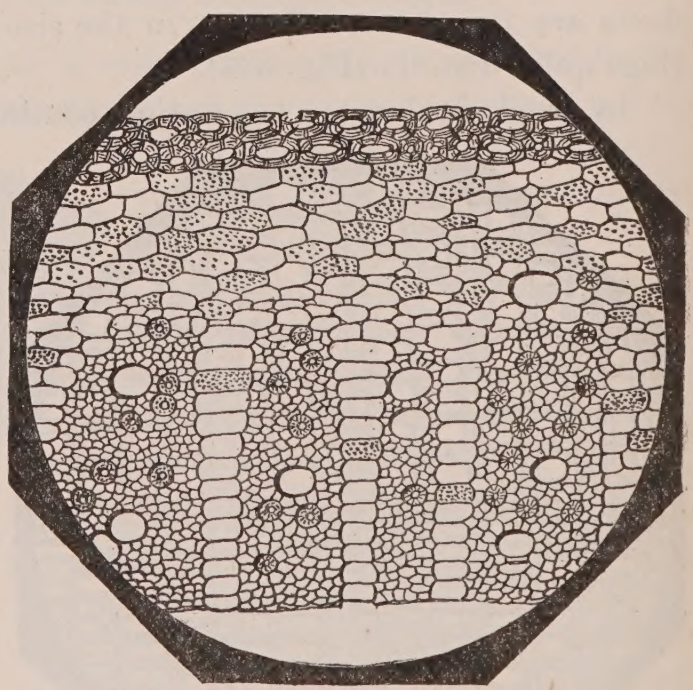


FIG. 635.—Transverse Section of Cinnamon Bark.

In some plants the bast is deposited in regular layers, one within the other, and then one layer may often be peeled from the others like leaves in a book, and therefore such bast is called *liber* (book).

In dicotyledonous plants we see plant structure in its highest perfection, because here we find the greatest tissue differentiation. In the

stems and roots of these plants we find *pith*, *wood*, and *bark*; the wood containing wood-cells, ducts, and medullary rays; the bark consisting of bast, bast-cells, fundamental tissue, cork, and epidermis, together with occasional resiniferous or laticiferous ducts.

The *pith* is usually composed of polyhedral parenchymatous cells which fill the space in the interior of the wood ring (Fig. 631). It is frequently surrounded by an almost continuous circular layer of larger ducts which, when present, constitute the *medullary sheath*, and these ducts occur in this position in such large numbers because the *meristem* or *pro-cambium* (as the first formed differentiated tissue, which is afterward to form the fibro-vascular bundles, is called) early in the season

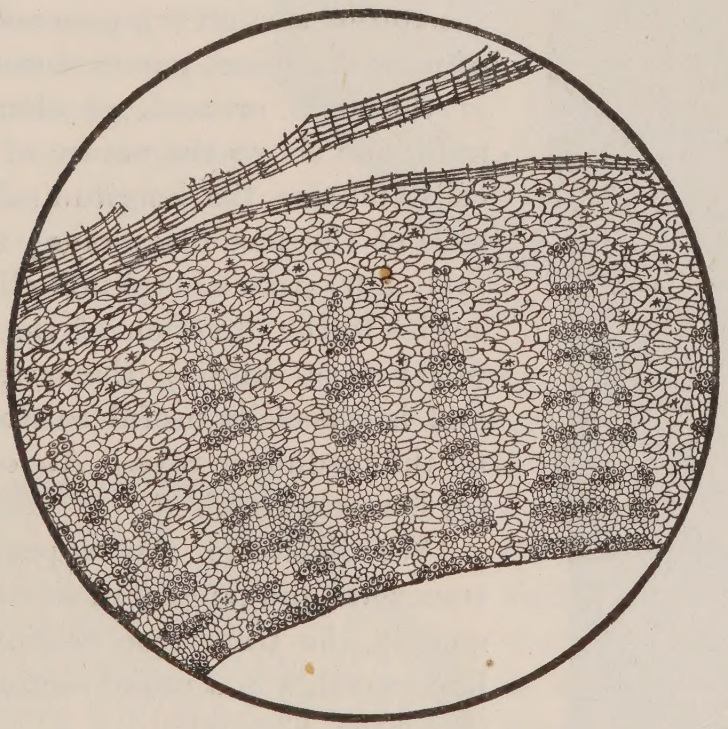


FIG. 636.—Transverse Section of Cotton-root Bark.

produces more ducts than wood, while later in the season very few, if any, ducts and more wood is formed.

The pith sometimes separates easily from its sheath, or at other times cannot be separated in large pieces at all. Generally, also, it fills the interior of the wood ring, but in very rapidly growing stems of some plants it may not keep pace with the growth of the other parts, and as the stem enlarges the pith is torn and hangs in shreds along the inner surface of the hollow stem, as in dulcamara. Only one pith, that of sassafras, is officinal.

It is also important to recollect that pith seldom is found in roots, though it may be present in quite large quantity in the stem of the

same plant. This is of use sometimes in detecting the substitution of the branches for the roots in drugs.

The medullary rays are very variable in size, usually being of limited extent in a tangential direction, while the width of them in the direction of the axis of the stem may be a single cell or dozens of cells.

Sections of stems or roots may be made in four directions, at least three of which are necessary for study before we can form a correct idea of its structure. The cut illustrates the direction in which they are made. The *transverse* section (*tr*) is at right angles to the axis of growth and is the most generally useful and instructive; the *radial* section (*r*), generally termed *longitudinal* section, passes through the centre of the stem or root, or along one of the radii, and shows the nature of the ducts and cells and also the longitudinal shape of the cells of the medullary rays; the *tangential* section (*t*) passes longitudinally but at right angles to the direction of the radii or medullary rays, showing the latter cut across, and is especially useful to study the nature of the medullary rays. An *oblique* section (*o*) is rarely required.

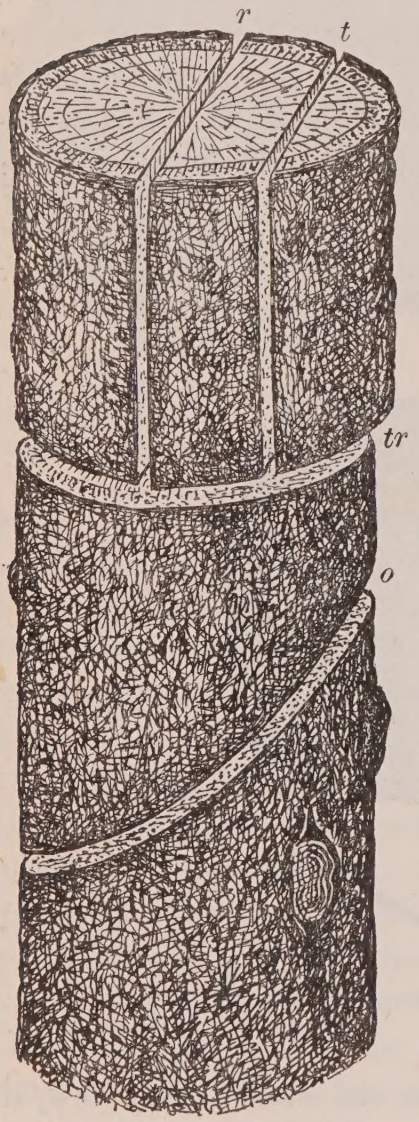


FIG. 637.—Showing different sections. *r*, radial; *t*, tangential; *tr*, transverse; *o*, oblique.

We illustrate the appearance of the transverse and tangential sections of Jamaica quassia, the transverse section of Fernambuco wood, and a radial section of logwood. (See Figs. 638–641.)

Sometimes in a tangential section the medullary rays seem so large that the fibro-vascular bundles appear to have forced their way through them with difficulty, while in other cases the rays are so small as almost to have disappeared. The number of cells in a perpendicular, as well as tangential direction, may vary much in different medullary rays of the same stem, or it may be nearly uniform, as in the woods of quassia or guaiac. So regular in structure are the medullary rays in Surinam and Jamaica quassia that the appearance of the tangential sections enables us to distinguish between the two woods.

If we cut a branch of willow in spring during the turgescence of the cambium, choosing a smooth and straight internode for the purpose, and

then beat it slightly with a flat stick or side of the knife-handle, we bruise and loosen the cambium-cells so that we may slip a tubular piece from the solid cylinder of wood. If we examine the two pieces with a lens we find that we have the pith, the xylem portion of all the fibro-vascular bundles, and the medullary rays as far as the cambium, together with a part of the latter, all in one piece that is commonly known as the *wood*. The tubular piece is seen to consist of the cuticle (epidermis and cork), a layer of parenchyma, all the phloëm portions of all the fibro-vascular bundles, the part of the medullary rays from the cambium outward, and a portion of the cambium along the inner surface of the tube; all this together constituting what is properly called the *bark*.

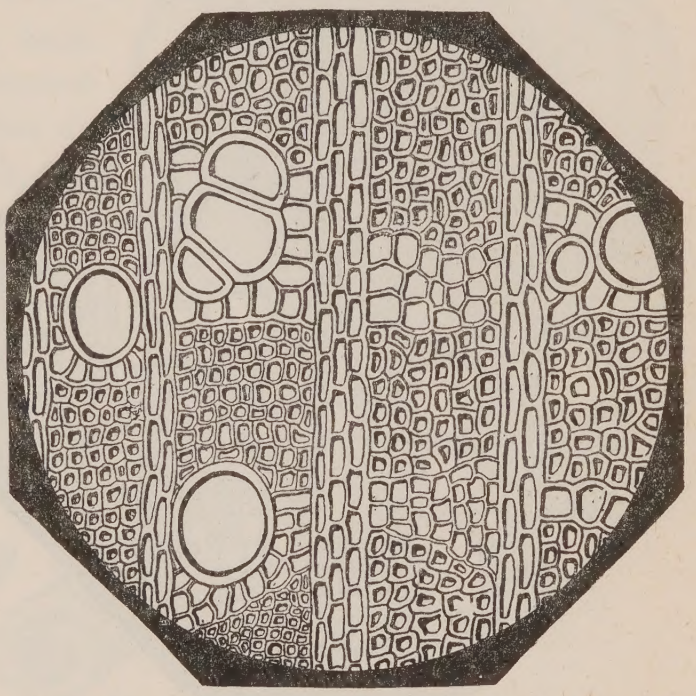


FIG. 638.—Transverse Section of Jamaica Quassia.

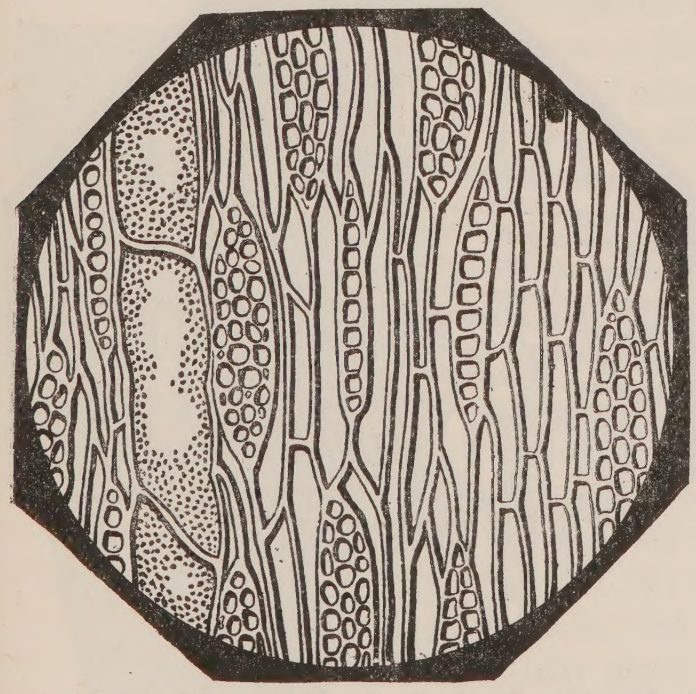


FIG. 639.—Tangential Section of Jamaica Quassia.

In Fig. 629 we see the boundary between wood and bark marked by a light line and a star. In most plants the bark at certain seasons of the year is easily removed from the wood, presenting a smooth surface within, which usually is of a reddish-brown color when dry.

When we cut or bite an apple and then lay it aside for a little while the wounded surface is changed to a light brown tint by oxidation. Cambium is often acted on in the same way ; for instance, sassafras bark when first peeled from the root is beautifully white within but becomes a lively red when dried. The same cause produces the dark-colored *cambium-*

zone which we see in many roots or rhizomes which are cut and dried in slices, as in calumba (Fig. 642).

In some cases, as in cascarilla, the bark does not separate readily from the wood, and must be chipped from the latter. In this kind of bark often but a part of its thickness is present, or portions of wood are attached to the inner surface.

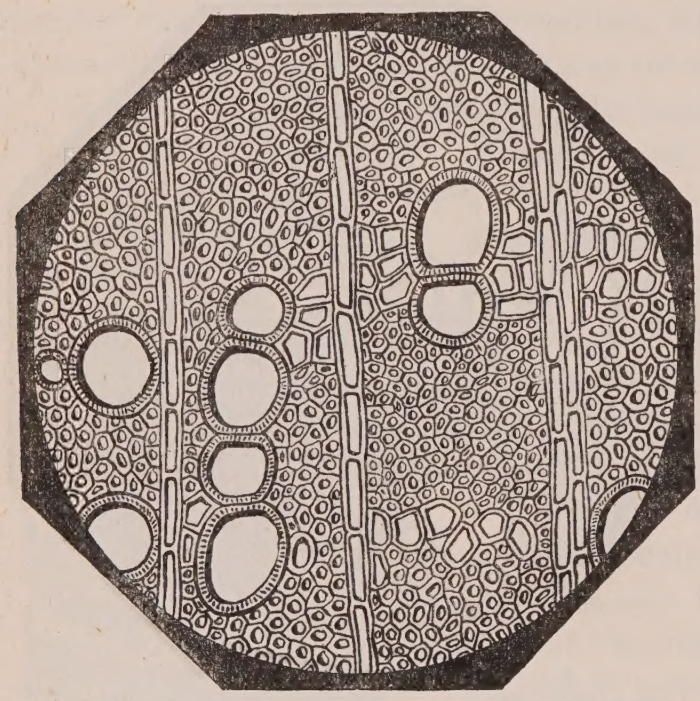


FIG. 640.—Transverse Section of Fernambuco Wood.

When the bark is removed the inner cells, which are softer and more succulent, lose their moisture and shrink, while the outer cells retain their shape. This generally causes the bark to curl inward, and according to the degree of curvature different names are given to the barks. When the curvature is slight, as in Fig. 643 *a*, the pieces are usually described as "curved pieces," but as curvature may take place in an irregular manner, we prefer to restrict the term "curved pieces" to pieces of bark of such irregular shape, and propose the term "*troughs*" as a more convenient, expressive, and appropriate word to describe the pieces of bark curved as in the drawing. If the bark is rolled from one side completely into a cylinder this is termed a *quill*, or a *simple quill* (*b*), while if it is rolled inward from both sides (*c*), it is called a *double quill*.

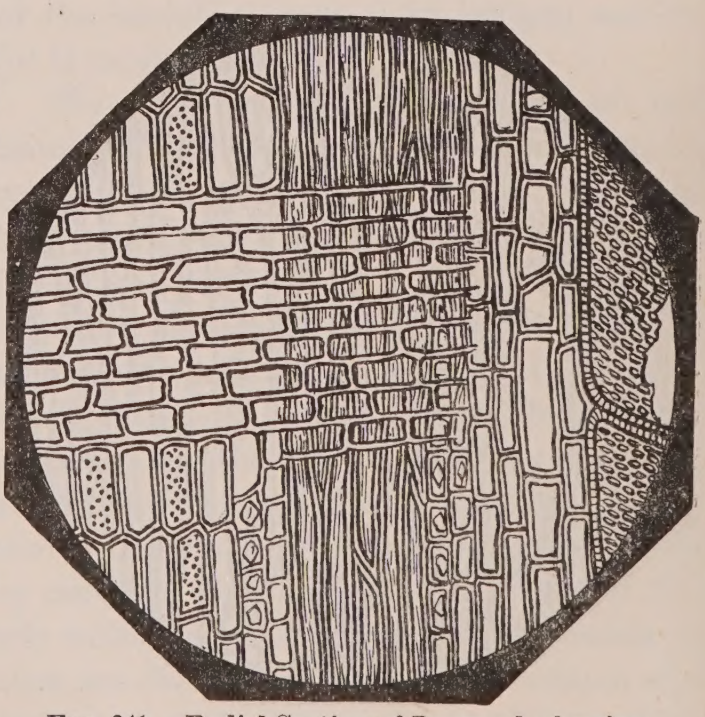


FIG. 641.—Radial Section of Logwood, showing Medullary Ray.

An unequal shrinking of bast and medullary rays will cause longitudinal wrinkles, or, if the external layers will not yield readily, so as to form quills on drying, fissures on the inner surface of

the bark, as in wild cherry bark (Fig. 646), or ridges as in alnus rubra (Figs. 647, 648).

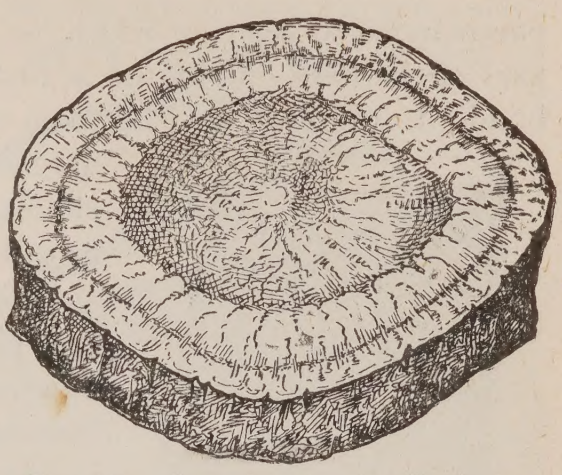
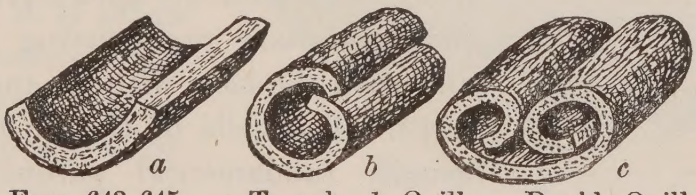


FIG. 642.—Calumba, showing Cambium-zone.

Occasionally the middle bark shrinks in drugs which are covered only with a thin layer of suber or epidermis, while the bast-cells are rigid and the bast-parenchyma also more or less unyielding, or perhaps bits of wood are attached on the inner surface when the bark is chipped off instead of being peeled off, and in such a case it is possible that the upper and lower ends of the bark curve outward, producing longitudinal curvature. We occasionally see this in cascarilla. Or the curving may be transverse, but with the cambium on the convex instead of on the concave side as is usual. Large, flat pieces of bark are seldom met with, except as the result of pressure while drying, as in flat calisaya, or when only the inner bark is present, as in slippery elm bark.



FIGS. 643–645.—*a*, Trough; *b*, Quill; *c*, Double Quill.

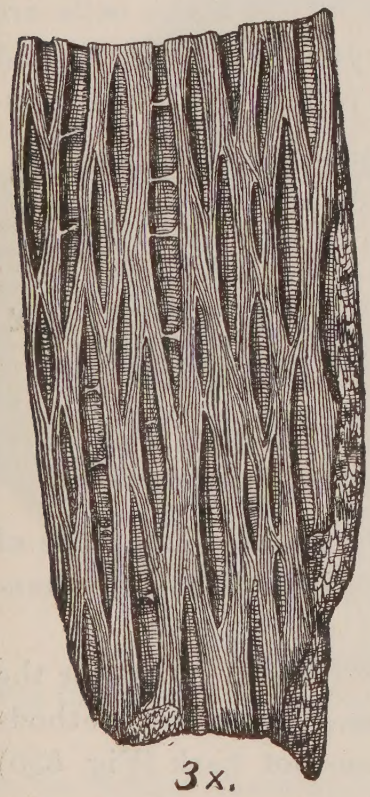
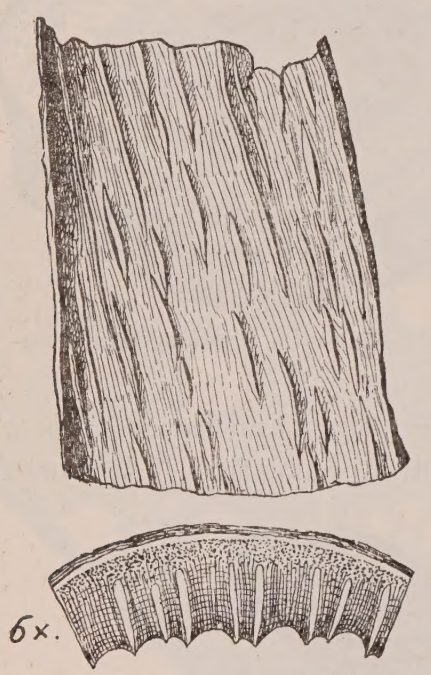


FIG. 646.—Inner Surface of Wild Cherry Bark, enlarged, showing fissures.

The typical bark consists of three parts, the *outer bark*, consisting in young stems or roots of epidermis (Fig. 649 *a*) and cork (Fig. 649 *b*), the epidermis often containing stomata in stems but not in roots. As the diameter of the part increases the cork is often fissured (see the figures under the titles Aspidosperma or Alstonia scholaris) in a characteristic manner, and may be cast off or retained in thick layers. This part of the bark is usually composed of tubular cells with elastic walls which appear tangentially stretched in a transverse section and which are impervious to water.

The *middle bark* (Fig. 649 *c*) consists of the fundamental tissue situated on the outer side of the phloëm, and forming a circle of

parenchyma of varying width, or it may be absent entirely. All that part of the bark outside of a line drawn from the apex of each bast bundle to the next, and between that and the cork, constitutes the middle bark, and is mainly composed of parenchyma, but may contain resin- or oil-ducts or cells, laticiferous ducts, stone-cells, etc.



FIGS. 647, 648.—Inner Surface of Alnus Rubra, natural size; and transverse section, enlarged.

The *inner bark* (Fig. 649 *d*) consists of the phloëm portion of the fibro-vascular bundles (*ph*), and the medullary rays (*m*) between them. The latter are narrowest at the inner surface of the bark and wider as they proceed outward. This causes the inner bark to appear to be composed of two sets of wedges, one set (phloëm) having the base within and the apex outward, the other set (medullary rays) fitting between these and with the base without and the apex inward. The cells of the medullary rays are usually fundamental parenchyma radially stretched in the inner portion; but as the phloëm becomes narrower and the medullary rays wider the cells become shorter in a radial direction until the medullary rays become merged in the middle bark in which the cells are tangentially stretched. On making radial or tangential sections we find the structure of the bark to be similar to that of the wood in corresponding sections, but the medullary rays are often very indistinct.

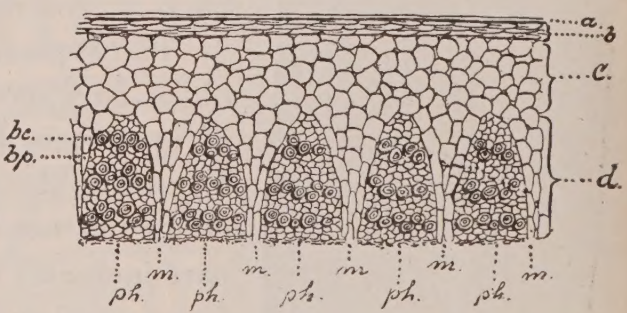


FIG. 649.—Diagram of Structure of Bark.

The phloëm (Fig. 649 *ph*) consists of *bast-cells* (*bc*) which are usually fusiform sclerenchymatous cells scattered through the phloëm in bundles or singly, and of *bast-parenchyma* (*bp*), the latter consisting of cells usually smaller than those of the medullary rays and middle bark; they sometimes become prosenchymatous.

The bast-cells and bast-parenchyma often alternate in layers, or the bast-cells are irregularly distributed in the phloëm. These two methods of distribution are shown in the section of cotton-root bark (Fig. 650) and of cinchona bark (Figs. 651 and 652).

The above is a description of a typical bark of which our drawing

presents a diagrammatic illustration, but the structure may, and generally does, vary from this. Secondary layers of cork may develop in any part of the bark, even in the inner bark, and as this tissue at once cuts off all nourishment from all cells without it, that part of bark external to such adventitious layers of cork is sequestered and dies, falling off or remaining adherent as dead tissue. This very frequently occurs in barks of conifers, cinchonas, etc., and when it does occur it is often difficult to understand the structure of the bark, which may appear to be very irregular.

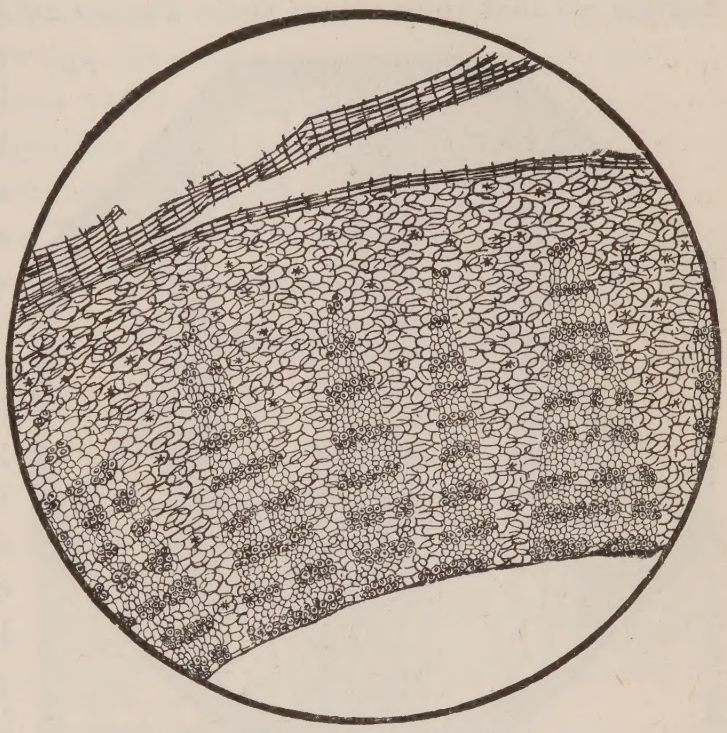


FIG. 650.—Cotton-root Bark.

Our illustration of dogwood bark (Fig. 653) shows us such a bark in which secondary cork (*s*, *s*, *s*) separates two layers from each other, the inner (*a*) being the living inner bark with medullary rays (*m*, *m*) and the outer being dead tissue.

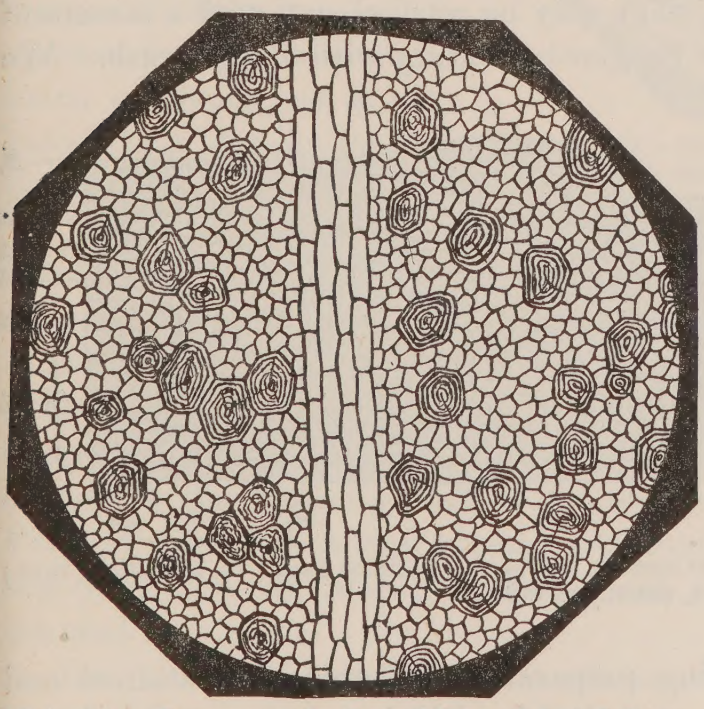


FIG. 651.—Transverse Section of Bast of Old Calisaya Bark.

In some works of botany the sequestered portion is called *bark* (*borke*, G.), but it is not the bark in a pharmocognostic sense.

It is plain that the structure we have described here as a true bark can only occur in plants with exogenous growth and never in endogenous stems or roots.

Leaves are usually large flattened organs designed to expose a large surface to the air for respiration. For the purposes of study the pharmacognocist may divide them into two classes—the leathery or coriaceous,

and the herbaceous, which differ in the rigidity of their structures, the leathery having more lignified fibro-vascular bundles and tougher epidermis, so that they retain their shapes on drying, as senna or eucalyptus; while the herbaceous have delicate fibro-vascular bundles, soft parenchyma, and thin epidermis, and shrink and crumple on drying, as in digitalis.

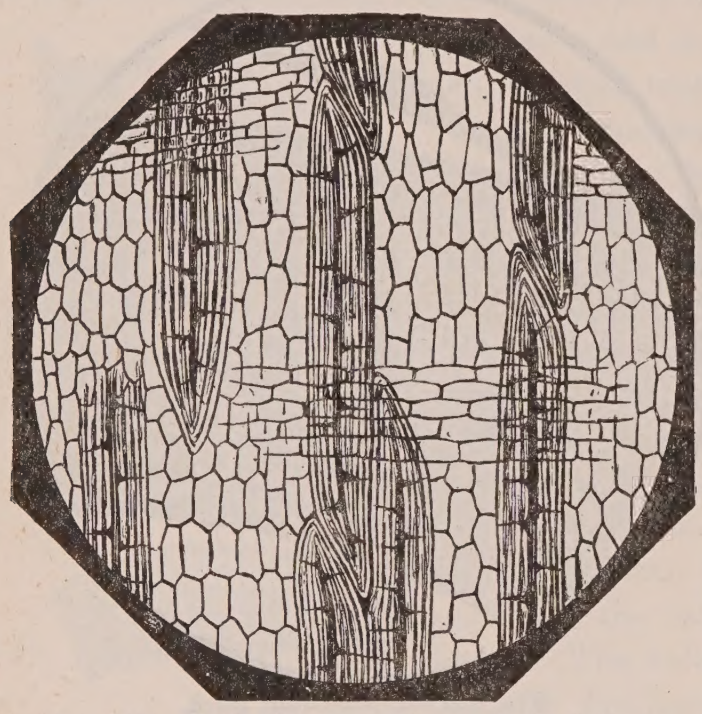


FIG. 652.—Radial Section of Bast of Old Calisaya Bark.

The *blade* of the leaf consists of a network of fibro-vascular bundles, which is a framework on which the leaf is expanded and supported, and which is called the skeleton of the leaf. Leaf-skeletons may be prepared by taking leathery leaves and placing them in rain (soft) water with a little yeast, and after some time taking them out and laying on a plate, when the epidermis and pulp have been so softened that they may be washed out with a stream of water from a spritz-flask, or by gently beating with a soft brush. We

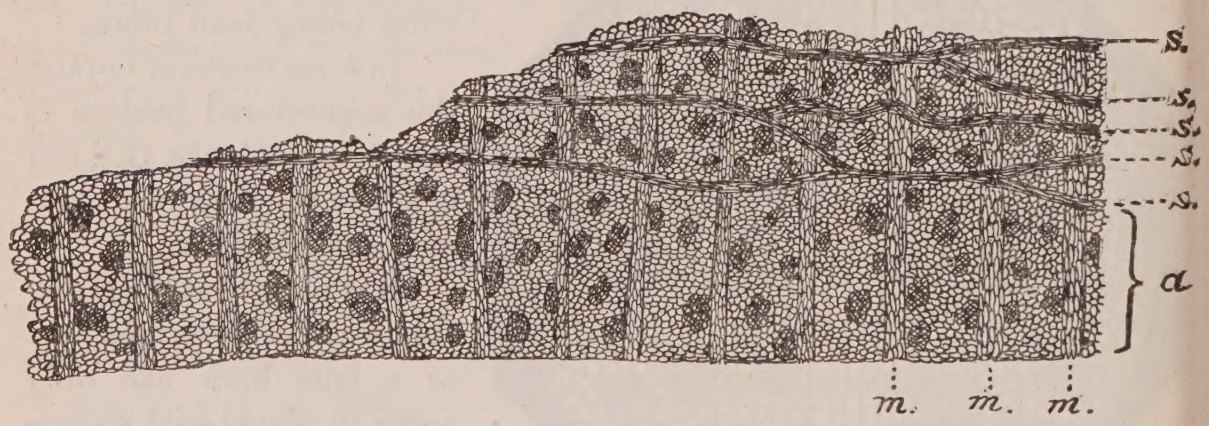


FIG. 653.—Dogwood Bark, transverse section, enlarged. *a*, inner bark; *m*, medullary rays; *s*, secondary suber.

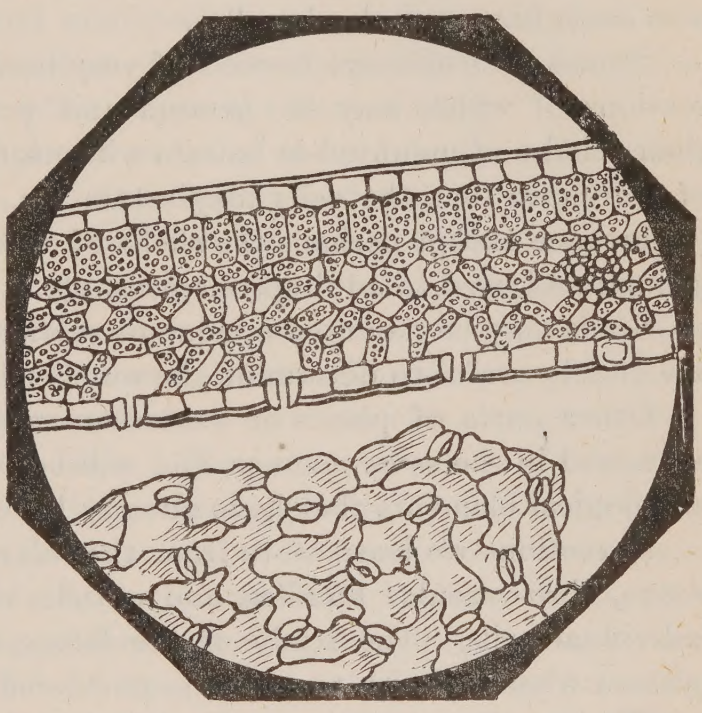
have some fine and interesting preparations of this kind stained and mounted in balsam. Or they may be bleached in solution of chloride of lime and dried between papers.

The interstices of the skeleton are filled with soft parenchymatous cells containing *chlorophyll bodies*, and as this parenchyma is compact

on the upper side and contains large air-spaces on the lower side, the color of the upper surface is usually darker than below.

The whole is surrounded by an epidermis which contains breathing pores or *stomata*, small openings between two or more *guard-cells* communicating with the air-spaces within. As the sun's rays on the upper surface would cause too rapid loss of moisture, the upper surface contains but few of these small organs, and besides, the epidermis sometimes is covered with exuded wax. This waxy or resinous coating is also seen in the varnish of the scales of hickory buds to keep out the wet of sleet and melting snow. The bloom of grapes and other fruits is also wax.

Moreover, dust might clog the pores, and such plants which grow in hot, sandy, and dusty soil, as oleanders, have no stomata at all on the upper surface, while in this plant even the stomata of the lower surface are situated at the bottom of little pits, the margin of which is guarded against dust by numerous hairs, which act just as the hairs about the breathing pores of insects.



FIGS. 654, 655.—Section of Leaf and Epidermis of Leaf; both magnified and diagrammatic.

This same purpose may, however, be subserved by a dense felting of hairs which often covers the epidermis of leaves, as in verbascum. Hairy leaves may be mounted opaque.

The arrangement of the stomata is often peculiar, if not characteristic, being generally irregular, but often in straight rows, as in corn or equisetum. Their number also varies from none at all (in the upper surface of the oleander leaf) to 437,500 in one square inch of surface. Perhaps some leaves may contain even more, but this number has actually been counted, or rather 700 in one square millimeter have been counted.

Leaves are further classified in pharmacognosy as they are in botany, as parallel-veined and netted-veined, entire, lobed, cleft, etc. Herbaceous leaves may be spread out for examination by steaming or dipping in hot water till soft.

The examination of flowers with the microscope is seldom necessary.

The sepals and petals have a structure similar to leaves. The ovary may be cut into sections or the anthers and stigmas examined. Only one stigma, of crocus, is of importance to the pharmacognocist. Morphologically fruits are leaves, and we find in them the same kind of structure. On the external surface is an epidermis, often provided with stomata, and even the inner surface of some legumes, capsules, etc., may have stomata in its lining epidermis. The fleshy part usually consists of soft-walled parenchyma, occasionally interspersed with isolated sclerenchymatous cells or clusters of them, as in the flesh of pears, and also some fibro-vascular bundles.

Stones of fruits are formed of very hard sclerenchymatous tissues, sections of which may be ground and polished on water-stones and then dried and mounted in balsam without first soaking in alcohol or oil of cloves, so that the cells may retain air. None of these are of any importance except perhaps the shells of cocoa-nuts, which are said to be ground and used to adulterate spices, etc.

Seeds may be mounted opaque or sections may be made. The latter are mainly useful to determine the number of cotyledons of the embryo.

Other parts of plants or excrescences of plants, as galls, may be examined in the same manner, and will be found to consist of the same histological elements that have already been described.

In sections we learn more from the relative position of fundamental tissue, fibro-vascular bundles, and cuticle, than from the study of the individual cells. The study of the latter, however, becomes very important when we wish to examine powdered drugs.

We have been able in the limited space allotted to this part of our work to mention only the ordinary or typical structures. Exceptions in arrangement may occur, as in the excentric arrangement of serpentaria ; the excentric and deficient development of wood in senega ; the absence of bast in ipecac, etc. ; but while we have not dwelt upon such unusual conditions it is nevertheless hoped that the information contained in the foregoing pages will enable any attentive reader to understand the description of the microscopical structure of drugs as given in such works as the Pharmacopœia, and other pharmacognostic works, and that it will enable any one to become a practical pharmacognocist.

The study will prove to be one of absorbing interest, and will repay any amount of labor bestowed upon it, not only in a material sense, but also by ennobling our minds by the deeper insight into the wonders of God's creation, and the harmony and perfection of nature's laws.

ON THE ADMINISTRATION OF MEDICINES.

It is generally known and admitted that, with the exception of a few local remedies, medicines must enter the circulation in order to exert their proper and peculiar effects upon the human body.

Various methods are employed to bring them into the circulation, such as epidermic, endermic, and hypodermic medication, inhalation, or introduction into the stomach or rectum, or into other cavities or channels of the body. Of these the hypodermic method is the most direct, and therefore the most prompt and certain in cases of emergency, but has many disadvantages which limit its usefulness. The fact that the physician himself must administer each dose restricts hypodermic medication to a very small number of cases. Then also this method is not free from danger, nor is it of sufficiently general applicability. The medicine may require too large a dose for injection, or the medicines, or the menstrua in which they are dissolved, exercise an irritating local effect, producing circumscribed abscesses, diffuse and extensive phlegmasiæ, or even erysipelas, endangering the life of the patient; or death may promptly result from the unfortunate injection of the medicine directly into a vein, or the effect may be slower, and clots formed in the veins are taken into the circulation, producing the disastrous effects of embolism.

The epidermic method consists in applying ointments, liniments, washes, medicated or plain poultices, etc., to the unbroken skin, and is most frequently used for local effects.

The endermic method of medication has become almost obsolete since the introduction of the hypodermic method, and is seldom resorted to except in chronic and obstinate neuralgias, sciaticas, and diseases of that character. The medicine is applied to a surface denuded by the application of a blister.

The introduction of medicines into the rectum is seldom made use of, except for local effect or when the patient is unable to swallow, as in strictures, ulcerations, cancer, or tuberculosis involving the œsophagus, pharynx, or larynx.

The introduction of remedies into other cavities or channels of the body is resorted to mainly for the local effect, as in washing out the

bladder, syringing the vagina or urethra, or washing the thoracic cavity, ear, or nose, or injecting various pathological cavities, as in abscesses, sinuses, and other similar cases.

Inhalation is practised for its local effect on the mucous membranes of the nasal fossæ, pharynx, larynx, tracheæ, or bronchial tubes, although occasionally it is also employed for its constitutional effect, as, for instance, in the case of the consumptives who resort to the *soffioni* in Tuscany, for the purpose of inhaling the warm vapors charged with boric acid.

Insufflation differs but little from inhalation, except that the medicines are in powder instead of in the form of spray ; and the blowing or dusting of iodoform upon wounds or into abscesses is similar to insufflation.

But for ordinary and daily use the physician is compelled to rely mainly upon the old and approved method of administering medicines *per os*, because the patient or the attendants can administer the doses, which can, therefore, be given in smaller quantities more frequently repeated. We will now endeavor briefly to describe some of the advantages and disadvantages of this mode of medication.

When a medicine is swallowed and enters the stomach and intestines, it comes into contact with the mucous membranes of these organs, and it must pass through them before it can enter the blood. But immediately outside of this membrane lie the fine capillary vessels whose walls enclose the ever-moving current of blood, so that to reach the latter the medicines must also pass through the walls of these vessels. As these two membranes are in contact, they are to all intents and purposes only one membrane through which our remedies may pass by a process of *absorption* or *osmosis*. It has been shown, however, by many and oft-repeated experiments, that no solid substances can pass in this manner, no matter how finely they may be powdered, so that all medicines must first be rendered fluid before absorption can take place.

As soon as a solid substance is taken into the stomach, a large quantity of an acid—gastric juice—is poured out, to the action of which the ingested substance is subjected. If it is of a mineral nature and soluble either in water or in acid it is dissolved in this secretion, which continues to be poured out until a dilute solution is the result, which is then taken up partly in the stomach and partly in the intestine ; but if the same substance is administered, already dissolved in plenty of water, no gastric juice needs to be secreted, and the absorption occurs at once in the stomach, commencing immediately upon ingestion. The effect will, therefore, be more prompt when we give a solution than when we give a powder of these mineral substances. But if the mineral sub-

stances are only soluble in an alkaline solution, they meet this in the intestines and are there rendered fit for absorption. In this case also the previous solution in water or some other menstruum will hasten their passage through the stomach and their final absorption.

If we administer vegetable substances they are acted upon precisely like mineral substances and submitted to the same conditions previous to absorption. If they are soluble in water, and are given in a solid form, gastric juice is poured out until they are dissolved and sufficiently diluted so that they can be absorbed. But if crude vegetable substances are given, as for instance powdered cinchona, the action is less simple. The bulk of this powder consists of lignine, cellulose, sclerogen, etc., all of which substances are not soluble in water or dilute acid, and while the alkaloids contained in cinchona bark might be readily acted on by the acid juice with which they come in contact, this contact is hindered and delayed to a great extent by the insoluble cell-walls. Hence the effect of our drug can be but slow and oftentimes imperfect. It is partly for this reason that the discovery and isolation of the alkaloids and the preparation of their soluble salts was so great an advance in pharmacy, and revolutionized the form of administering medicines.

We must also bear in mind that the larger dose and insoluble form of such powders may produce objectionable effects by its mere physical irritation of the delicate and possibly inflamed mucous membranes.

No one can doubt the assertion that sulphate of quinine, in solution, will act quicker than its equivalent quantity of powdered cinchona bark, though there may be a difference in action, to which we shall presently refer.

There are still other substances, of an oily nature, as castor-oil, which require an alkaline solution to emulsify them, which they meet in the pancreatic juice, and probably also the bile, by the aid of which they are transformed into a milky emulsion which can enter the lacteals. Resins, oleo-resins, and balsams are saponified by the same fluids, for resins, whether simple or in combination with a volatile oil in oleo-resins, or in balsams with benzoic and cinnamic acids, are themselves but peculiar acids insoluble in water, but readily soluble in alcohol, or rendered soluble by alkaline solutions. Resins form the active principles of many of our drugs, as in podophyllum, jalap, and guaiac, and among them we find some of our most valued blennorrhetics, diaphoretics, diuretics, and cathartics.

Many neutral principles similar in their nature to resins are also dissolved in a similar manner, and it is a matter of experience that if substances of a resinous or resinoid nature are administered in an alkaline fluid, their action is increased and made more certain, and smaller doses

will usually suffice. An acid, on the other hand, retards the action of a resinous substance, and this kind of drug is, therefore, not readily dissolved by the gastric juice, and even when it has left the stomach and entered the intestine the acid of the gastric juice must first be neutralized by the alkaline secretions in the intestines before saponification or emulsification can be effected.

But there may be, and often are, conditions of the patients when no gastric juice will be secreted, and the medicine, if not given in solution, fails to meet with sufficient fluid to enable it to be absorbed. Under such circumstances solid substances may and do pass through the alimentary canal, and are voided with the stools without any, or with only imperfect effect, and this condition is most apt to occur in those severe illnesses when the physician is most anxious to produce a prompt and full impression with his remedy.

Or instead of passing out of the system, these substances are retained in the intestinal canal, and may accumulate there until the secretions are restored, when a large quantity being acted upon at once, may produce the *cumulative effect* which often alarms and sometimes is fatal.

It is true that the above-mentioned is not the only cause of the *cumulative effect*, as this sometimes depends on a failure of the secreting organs to remove the remedy from the system in a proper manner, allowing it to accumulate to an excessive extent until disagreeable symptoms result. But the above reason explains a not insignificant proportion of cases of *cumulative effect.*

It is therefore logical and reasonable to believe that fluid preparations of drugs and chemicals are more effective than solid preparations of the same substances.

Pills often fail to act when solutions act promptly. Besides, in the pill but a very small surface is acted on at a time, and even if dissolved, the action is slow, while the substance of the pill, coming into contact in a concentrated form with the mucous membrane, is apt to irritate this delicate structure, as, for instance, when we give salicylic acid in pill form, or when we give resinous cathartics in the same way. The latter are much more apt to produce griping than when given in alkaline solutions.

The liquid preparations, therefore, should be preferred to solid forms, and we next wish to inquire what class of liquid preparations are of most general use and applicability.

In the case of mineral substances simple solution in water is often sufficient, but more frequently the efficacy of the remedy can be increased to a great extent by combination with tonics which accelerate absorption,

while aromatics and sugar render otherwise disagreeable substances quite agreeable to the taste.

Vegetable substances may be given in various liquid forms, of which sometimes one, sometimes another offers special advantages.

Alkaloidal salts which are very soluble are often given with good effect in the form of powders, as, for instance, morphine, but preferably in solution with a little syrup and some water. But comparatively few drugs furnish isolated principles which can be given in this form. Besides, it is a mistake to suppose that the action of vegetable drugs depends on a single isolated principle. The alkaloids themselves are generally almost insoluble in water, while their salts are more easily dissolved, and usually they exist in the drug associated with extractive and other matters which are capable of effecting their solution. Often the action of the drug depends upon a combination of principles rather than upon any one, as is well illustrated in opium with its many alkaloids and other principles.

Fluid preparations, therefore, which contain all the active substances of a drug, rejecting only the insoluble or inert lignine, cellulose, starch, etc., will best represent the drug and most completely exert its action.

Probably no one class of preparations is of more general use, or represents the crude drugs better than the fluid extracts. These preparations are essentially American, having been introduced first in this country, and being to this day almost exclusively used in American medicine. They are officinal only in the Pharmacopœia of the United States, and it seems almost incredible that the obvious superiority of fluid extracts over tinctures, decoctions, infusions, etc., has not been recognized by the pharmacopœias or the medical profession of other countries.

In these preparations are combined all the advantages, and few if any of the disadvantages, of administering medicines *per os.* In using them we give our medicines in the smallest possible bulk *to be readily absorbed.* The dose is more easily remembered than that of tinctures, since a cubic centimeter equals a gram of the crude drug (or very nearly one grain for each minim). The fluid extracts are prepared with appropriate menstrua which thoroughly exhaust the drug ; they are compact preparations for the medicine-chest or saddle-bags, and by adding a little sugar and water as good a solution or mixture can be made at the house of the patient as in the office or drug-store, and even if the fluid extract produces a turbid mixture by the precipitation of resin, the latter is so finely subdivided that its particles are scarcely perceptible even under the microscope, and present, therefore, the greatest possible surface for the action of the intestinal fluids. The only serious objection that can

be urged against the fluid extracts is, perhaps, that they possess in an intensified degree the often objectionable taste of the drugs. But this is not always an objection.

Observing physicians have undoubtedly often noticed the beneficial effect of the *bitter taste* in increasing the appetite of their patients, as for instance in the use of quassia cups, where so little of the substance is dissolved as to amount almost to nothing, while it yet imparts the intensely bitter taste upon which mainly the action depends.

Medicines sometimes have adventitious valuable effects which are produced by their influence upon the gustatory nerves. The effect of a prescription may even depend entirely upon the faith of the patient, and yet who would be willing to omit the prescription if faith alone is beneficial and can be best inspired by prescribing a *placebo?*

That effects may be produced by other impressions than those of the ingested substance upon the stomach, or upon the system after absorption, may be shown by the result which takes place when a person has eaten a bowl of delicious turtle-soup, and finds a cockroach at the bottom of the bowl. The vomiting which results is caused by an impression upon the optic nerve, for if the cockroach had been found and removed by the cook, the soup, though the same, remains delicious. Besides, the cockroach (*Blatta orientalis*), when given as medicine, without the knowledge by the patient of its nature, is diuretic and not emetic.

That these adventitious effects in medicines are frequently valuable no one can deny, but they are lost to us when we employ the sugar- or gelatine-coated pills, in which the taste is uniformly sweet or insipid.

EXTEMPORANEOUS PRESCRIPTIONS.

THESE are formulæ written by the physician to meet the requirements of individual cases. Frequently the term "prescription" is applied to the paper with all it contains written upon it.

Considering it in this sense, the prescription should begin with the name of the person for whom it is prescribed, and the date of the day on which it is written. The date is often written by giving the *number* of the month instead of the *name*, thus: 6—11—83. Unfortunately there is no uniform usage in this practice, some reading this as the *sixth day of the eleventh month*, others as the *sixth month, eleventh day.* Of course no mistake can be made in regard to the 13th, or any subsequent day of any month.

It is better, however, to write the number of the month in Latin, the number of the day in Arabic numerals, thus: 6—XI.—83. If this were the universal habit it would make no difference which is written first, the number of the day or month.

After the name and date follows the prescription proper, which may be written according to either of two methods, all the ingredients in a regular sequence according to their action, or irregularly according to the pharmaceutical requirements in dispensing.

We shall consider, first, the former and more usual method.

The prescription consists of four parts, the *Superscription*, the *Inscription*, the *Subscription*, and the *Signature* or *Direction*, as in the following plan:

Superscriptio. ℞.

Inscriptio..... { Basis. / Adjuvans. / Corrigens (*seu* Dirigens). / Excipiens. / Diluens.

Subscriptio .....

Signatura .....

The *Superscription* consists of the letter R, or the sign ℞, and signifies "*Recipe*" (take). This sign is a relic of the influence of alchemy

and astrology on medicine, being the symbol for Jupiter, ♃, provided with the downstroke of the R. It was at one time not uncommon to begin the prescriptions with the letters *C.D.*, meaning *Cum Deo* (*with God*, or, *in the name of God*), and even at the present time the sign of the cross +, or a double cross ∓, is substituted by some physicians of our acquaintance for the symbol of the heathenish Jupiter.

Next follows the *Inscription* (also called *Designatio Materiæ*) which is an enumeration of the ingredients. The names of these are written in a certain order.

The most important drug, that on which we base our expectations of success, is called the *Base* of the prescription. Upon its nature we base our choice of the other ingredients. Being the most important, it is written first. It may be, and often is, the only ingredient of our prescription, as when we order a certain quantity of only one substance.

But frequently it is not sufficient in itself to meet all the indications of the case, and we must add another substance which will assist its action, and which is called an *Adjuvant* (*adjuvo*, I assist). This ingredient is generally of a similar nature, as when we combine senna with salts, both cathartics in combination being more certain to act than either alone. The adjuvant may differ in its action, however, from the base, as when we combine sulphuric acid with quinine, the state of solution being much more favorable to the rapid absorption and action of the medicine. The adjuvant should not be of a nature opposed in its action to that of the base. A diaphoretic is not a proper adjuvant to a diuretic because the secretion of urine is in a sense antagonistic to that of perspiration since they are complementary, one increasing as the other decreases in quantity, and *vice versa*.

The third ingredient is the *Corrective*, which is used to correct certain objectionable physiological or therapeutical actions of the base. Humming in the ears is often a distressing effect following the administration of quinine, and may be prevented by giving bromide of potassium with the quinine. The bromide is then a corrective.

Chloroform and carbonate of ammonia are pungent when taken internally; tincture of cantharides is irritant, etc.; and the mucilage used to render these substances less irritable is a corrective.

In syphilis we may administer calomel to act on the system, and find that it acts on the bowels. We add opium to counteract or correct its cathartic effects.

Spigelia is an anthelmintic cathartic or narcotic. It usually acts on the bowels, but if it fails to be eliminated in this manner its force is spent on the cerebral centre and it acts as a narcotic poison.

Turpentine usually has the same effects as spigelia, being an anthel-

mintic cathartic. If it fails to act on the bowels it is eliminated by the kidneys, and the dose may overwhelm the latter organs, producing congestion, perhaps even strangury or hæmaturia.

To prevent or correct these evil effects both spigelia and turpentine are usually given with other cathartics, the first with senna, the other with castor-oil.

We may also say that the action of the senna or castor-oil in such cases determines the action of the respective bases to certain organs of the body ; that they are *directives.* In some of the works on pharmacy this word is applied to the adjuvant, the latter being stated to often be directive in its nature. We think a careful analysis of the relations of the ingredients to each other will show in the great majority of cases that the directive is rather corrective than adjuvant in its nature.

A base may possess certain organoleptic properties, as color, smell, or taste, which are disagreeable, but not objectionable on any physiological or therapeutical grounds. We can improve the medicine in these regards by adding an *Excipient,* as syrup, aromatic tinctures, etc. The excipient is also used to give a certain desirable degree of consistence to our preparation. A mucilage or syrup in a mixture prevents the too rapid subsidence of a suspended powder ; powdered acacia serves to suspend the oil in an emulsion ; tragacanth paste or an extract may be employed to incorporate dry powders in a mass to make pills, or the latter are dusted with cinnamon or aromatic powder to prevent them from adhering and to improve the taste ; or they are coated with gelatine or sugar ; in all these instances we have examples of excipients, but the powder used for dusting on pills is sometimes called a *conspergative.*

Often the other medicines are in such a form that it would be very difficult if not entirely impossible to administer proper doses. How, for instance, could we give $\frac{1}{60}$th gr. of strychnine unless we added some such substance as sugar, or extract of glycyrrhiza, or some fluid to increase the bulk. If we dissolve a grain of strychnine in 8 fl.ozs. of simple elixir, each teaspoonful will contain $\frac{1}{64}$th grain of the alkaloid. We add half a drachm of sugar to a grain of morphine and divide into six doses, and each powder contains the sixth part of a grain of morphine. The elixir or the sugar in such a case is a *diluent,* and it will be observed that this ingredient may be liquid or solid.

We thus comply with the ancient advice :—

"*Curare*	Base	"To cure
cito	Adjuvant	quickly,
tuto	Corrective	safely,
et jucunde" ...	{ Excipient / Diluent. }	and pleasantly."

But not every prescription contains all of these different ingredients. We may have prescriptions with the base alone; or the base with adjuvant; the base with diluent; the base, excipient, and diluent; the base, adjuvant, and excipient, etc. Or one ingredient may serve for more than one purpose, as syrupus rhei aromaticus with quinine, where it serves as an adjuvant to increase the effect (rhubarb is said to have this property), as an excipient to improve the taste, and as a diluent to facilitate the administration of the doses.

It will prove of great interest as well as benefit to analyze the prescriptions we may meet with in our reading or our business, so as to become thoroughly conversant with the object of each ingredient. It is unfortunately too true, however, that in many of the prescriptions we meet it is difficult to divine the intentions of the prescriber in adding some of the ingredients, and it is but probable that he did not know himself what part they were to take in the compound.

The *Subscription* follows the inscription and consists of the directions to the druggist, telling him how to compound the prescription. Formerly this was often verbose and ridiculous, as in the following example, copied from the "Examples of Common Extemporaneous Prescriptions," in a well-known and valuable work:

"℞. Olei ricini..... f ℥ jss.
Tincturæ opii ..... ♏ xxx.
Pulv. acaciæ,
Sacchari .....āā ʒ ij.
Aquæ menthæ viridis..... f ℥ iv.

"Acaciam et saccharum cum paululo aquæ menthæ tere; dein oleum adjice, et iterum tere; denique aquam reliquam paulatim infunde, et omnia misce.

"S.—A tablespoonful to be taken every hour, or two hours, till it operates, the mixture being each time well shaken."

It is needless to say that such a subscription would at the present day be considered amusing by the intelligent druggist, who perhaps knows better how to make the emulsion than the prescriber. We use very short subscriptions now, the letter *M* (misce) generally being sufficient, unless special instructions are necessary, as when we order powders to be dispensed in wafers or capsules, etc.

We believe this part of prescription-writing could be much simplified by using the vernacular instead of the Latin language; and this would simply be following the good example given in the abandoning of the pedantic directions of a quarter of a century ago, which,

however, are still employed by a few antiquated, non-progressive authors.

Physicians have, or ought to have, too much common sense to try and appear wise by writing such formulas as "D. in 2 plo.," "Coch. magn. omn. quad. hor. ads. febr.," etc. The same practical sense that would lead us to write "C. O. D." instead of "*Ne tr. s. num.*" (*Ne tradas sine nummo*, Do not deliver without the money), ought to lead us to use full or abbreviated English words in our prescriptions except for the names of the drugs or of their preparations.

The *Signature* is the concluding part of the prescription. It contains the directions to the patient which the prescriber wishes to have placed upon the label of the medicine when dispensed.

These directions should always be written in the language of the country, or, if possible, in the mother-tongue of the patient or attendant. They should be reasonably short, but complete, and not merely "use as directed." The practice of some druggists to ignore this part of the prescription entirely and to write "*use as directed*," no matter what the physician may have written, is reprehensible, and may lead to disagreeable consequences for the druggist. Surely such a substitution of indefinite directions for the definite ones ordered by the physician, if followed by an accident, ought to render the druggist liable to a prosecution for criminal carelessness. The dispenser has as little right to substitute other directions for those ordered as he has to substitute one drug for another.

In writing the directions it is customary to begin the line with the letter *S.* (signa) ; or the letters *M. S.* are written on one line. Sometimes the letters *M. D. S.* are used. They mean

Misceantur ; Dispense Signatura.

(*Let them be mixed ; give, with the signature.*)

Signatura here is in the ablative case, the case itself implying the word *with*. *M.* may be rendered *misce* (*mix*), just as well.

Finally the prescriber should write or print on the blank his own name, the location of his office or residence, and his consultation hours, so that he may be readily found and consulted if he should make a mistake which requires correction.

The other form, of writing prescriptions with reference to the pharmaceutical manipulations of dispensing, can only be illustrated by an example, as this form will of course vary with the nature of the ingredients.

We choose as an example a prescription for an emulsion and write the words out in full, although in practice they would be abbreviated :

℞. Olei amygdalæ dulcis.....f ʒ vj..... Adjuvant.
Acaciæ pulveris..... Excipient.
Aquæ, ana quantum satis ..... Diluent.
Ut fiant emulsionis.....f ℥ iij.....
Adde
Tincturæ opii .....f ʒ j..... Base.
Bismuthi subcarbonatis..... ʒ j..... Adjuvant.
Syrupi sacchari.....f ℥ j..... Excipient.
Misce. Signa.
.....

This form is very convenient, both for the prescriber and dispenser, but requires a considerable degree of pharmaceutical knowledge on the part of the former. If such knowledge is not possessed, the other form of prescription will give better satisfaction.

SIGNS, ABBREVIATIONS, ETC., USED IN PRESCRIPTIONS.

Physicians who do not yet employ the metric system of weights and measures in their prescriptions, use

Troy or Apothecaries' Weight.

20 grains (gr.)	=	1 scruple (℈ j.)
3 scruples	=	1 drachm (ʒ j.)
8 drachms	=	1 ounce (℥ j.)
12 ounces	=	1 pound (lb.j.)

The quantities are expressed in the above signs, and *roman* numerals are used after the signs of quantity.

The term *lb.* ought not to be used at all in prescriptions or in formulas, to avoid confusion between the troy and avoirdupois pounds, containing 5,760 and 7,000 grains respectively.

Lb. preceded by Arabic numerals means avoirdupois pounds, thus, 1 *lb.*; *lb.* followed by Roman numerals means troy pounds, thus, *lb. vj.* The sign for avoirdupois pounds is *lbs.* in the plural, while the sign for troy pounds is *lb.* in the plural as well as in the singular. Sometimes the sign for troy pounds is characterized by being crossed, thus, ℔.

The sign for troy ounce is ℥. The sign for avoirdupois ounce is *oz.* or *av. oz.* We buy drugs and chemicals by avoirdupois and dispense by troy weight, unless we use the metric weights. The ounce should never be used in prescribing.

The sign for drachm is ʒ. Sometimes it is written *dr.* This sign should be dropped in prescription writing.

The sign for scruple, ℈, is rapidly becoming obsolete, and should also be dropped.

The sign for grains is *gr.*, both singular and plural.

Liquid Apothecaries' Measure.

60 minims (♏)	=	1 fluidrachm (f ʒ)
8 fluidrachms	=	1 fluidounce (f ℥)
16 fluidounces	=	1 pint (O.)
8 pints	=	1 gallon (Cong.)

The use of the signs for gallon and pint (*Cong.* and *O.*) in prescriptions or pharmaceutical formulas is obsolete.

When the quantities are too small to be conveniently measured, drops are often directed to be taken, the sign for which is *gtt.*, for plural as well as singular. The drop is very variable in size, and its employment, therefore, is conducive to inaccuracy.

These signs are also followed by Roman numerals, which should be distinctly written.

It is customary in writing to use *j*, instead of *i*, for the last numeral, thus, *ij.*, *viij.*, etc. "One-half" is written *ss*, or occasionally the sign *ß* is met with, which is a contraction of the written German *sz*, or of the English long and short s, *ſs*. The sign means *semissa* (one-half). Other fractions are written in Arabic numerals, thus, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, etc.

When the quantities of two or more ingredients in a prescription immediately following each other are alike, the quantity need only be written after the last name, but must be preceded by the sign āā (*ana*, each) ; thus, "āā ℥ j." means "of each an ounce."

When the quantity of an ingredient to be employed in a prescription cannot be accurately determined, it is necessary to say, "take a sufficient quantity," which is expressed by writing "*q. s.*" (*quantum satis*) after the name of the drug. But this, of course, can only be done when the ingredient is of minor importance, as in the case of the excipient or diluent, and even in such cases only if the nature of the case determines the quantity.

For instance, in prescribing pills it is often impossible to determine exactly the quantity of excipient which will be required to make a mass, and we write the name of the excipient and *q. s.*, and the druggist takes just enough to make the mass.

But in prescriptions as the following,

"℞. Plumb. acet..... ℥ ij.
Morph. sulphat..... gr. iv.
Butyr. cacao..... ℥ ss.
Ol. olivæ..... q. s.
M.,"

the words *q. s.* are not appropriate, for the pharmaceutical requirements will not determine the quantity of the substance to be employed; none of the oil is necessary to enable the druggist to compound the prescription, while an ounce of the oil will not be too much to form an ointment. The precise quantity of the oil should have been stated.

If the medicine is desired to be dispensed in a hurry, the physician writes upon the prescription the word "*Cito*" or "*Citissime*" (*quickly*). Of course such a prescription ought to be simple enough to allow it to be dispensed in a hurry, and it should be given precedence of everything else by the druggist.

Excessive doses on a prescription should be marked by the physician if he expects to have them dispensed. Otherwise the druggist cannot be blamed if he refuses to compound the prescription.

The letters "*Q. R.*" (*quantum rectum*), or the exclamation point in brackets may be placed before the name of the substance of which the excessive dose is ordered. Or the quantity may be expressed in signs and at the same time written out in full, thus :

℞. Opii pulv..... gr. vj. (six grains !)
Sacchar. alb..... ℥ ss.
M. Div. in pulv. vj.
S. One powder every three hours.

Such doses might be required in peritonitis or in patients accustomed to the use of this narcotic.

The word "*ad*" is often employed after the name of some ingredient, generally the diluent, and before the sign of quantity. It means that enough of that substance is to be taken to make up to a certain amount. Thus : "Aquæ ad f ℥ vj." means that after all the other ingredients are taken, enough water is to be added to make the whole measure six fluidounces. This is sometimes written "*q. s. ad.*" instead of simply "*ad.*"

If the patient is poor and cannot pay fully for services or medicines, the letter "*P*" is often written after his name, or in the upper right-hand corner of the paper, or the letters "*PP*" if too poor to pay any-

thing. These letters signify *pauper* or *pauperrimus* (*poor* or *very poor*). Of course no physician would use these words to lead the druggist to charitably dispense the medicine unless he himself attended the patient gratis.

We have known of agreements between the doctor and druggist, for the former to make some sign on the prescription by which the latter could know whether the patient might be given credit or not. Of course it is best to do business on a cash basis, but sometimes the patient has only children or servants to send, or for other reasons prefers to have an account kept. If the physician knows the patient or family, a little asterisk or other sign gives the druggist the desired information. This requires a preconcerted understanding between the two, the doctor and druggist, as it would not otherwise be understood, and they can agree on an appropriate sign for this purpose, which must be so inconspicuous as not to attract the attention of any but the interested parties.

The agreement between doctor and druggist for the use of private signs and names, so that no other druggist is able to understand and compound the doctor's prescription, is generally condemned as dishonest and disreputable, no matter what the motives of both may be. A doctor certainly has the right, and in justice to himself and his patient he should exercise the right, of recommending the patient to go to a druggist whom he knows to be properly qualified, rather than letting the patient go to any one who, perhaps, is not so well able to properly fill the prescription, but he can do this without writing in hieroglyphics or cipher.

The physician's duty to his patient does not end with the mere writing of the prescription, but he is under a moral obligation to do the best he can for the patient, which implies that it is his duty to try to have the several ingredients of as good a quality as possible. If he knows where the prescription is to be compounded, and knows the preparations dispensed by that pharmacist to be reliable, he need only write the names of the ingredients. But if he does not know who is to dispense the prescription, and, therefore, does not know the quality of preparations that will be used, the doctor owes it to himself and his patient to write after the name of the ingredient the name of some pharmacist, or manufacturer, whose preparation he positively knows to be superior, and whose preparation he therefore wishes to have dispensed; and it is perhaps better for him to do so in all cases in which he has a decided preference for any particular preparation. No pharmacist who will disinterestedly put himself in imagination in the doctor's place long enough to calmly think the matter over, will blame the doctor for thus

specifying, and he will no more think of substituting some other preparation for the one specified than of substituting cinchonidia for quinine. The difference between different fluid extracts of ergot, for example, is often greater than between the two alkaloids mentioned.

DOSES.

The dose of a drug, as stated in the works on materia medica, is generally understood to be that quantity which will produce the full effect of the drug, unless the contrary is especially stated.

The dose of opium, for instance, is said to be one grain, and this is the quantity generally required to produce sleep or to relieve pain in an adult patient. This dose may be given at once or in divided doses, although the effect to be obtained may occasionally determine our choice in this regard. Thus, opium is better given in a full dose to produce sleep, while broken or divided doses are preferable for relieving pain, especially when the cause of pain cannot be easily or rapidly removed.

Quinine is given in doses of twenty or thirty grains as an antiperiodic, and this dose may be given at once or in doses of a few grains at certain intervals of time, but which of these methods of administration is to be chosen in any individual case must, of course, be left to the intelligent judgment of the attending physician ; but it may be recollected that a larger quantity is generally required when the drug is given in divided doses.

The dose of tincture of chloride of iron, on the other hand, is expressly directed to be given in repeated doses. The dose of the U. S. tincture is from ten to thirty minims, which may be gradually increased to one, or even two fluidrachms two or three times a day.

The doses given in the books are adapted for adults, or persons in the prime of life, from twenty-three to twenty-four years to about forty-five to fifty years of age. After that age most medicines must be given in smaller doses, and especially eliminative medicines, as cathartics, etc.

Females require somewhat smaller doses than males ; yet this is only a general rule to which there are numerous exceptions. The condition of the individual patient must be considered before determining the dose.

The doses for children may be determined by dividing the age of the child in years by the same number of years plus 12 ; thus:

$$\frac{4}{4+12} = \frac{4}{16} = \frac{1}{4}$$

for a child four years of age.

This is not true of narcotics, especially of opium, which must be given

in relatively smaller doses, and of mercurials or arsenic, which may be given in comparatively larger doses.

NOTE.—*In this book the doses are stated in both metric and troy weights and measures. They are not stated in exactly equivalent amounts, but in such quantities in each system as are easily remembered and approximately equivalent, fractions and odd numbers being ignored as unnecessarily cumbersome.*

Table showing doses of the preparations of the old Pharmacopœia, as compared with those of the new, in all cases where the strength has been materially changed.

PREPARATIONS.	Dose of the old preparation, U. S. P. 1870.	Dose of the new preparation, U. S. P. 1880.
Aconiti Foliorum Extractum	1 to 3 grains.	.....
Aconiti Radicis Extractum	.....	$\frac{1}{20}$ to $\frac{1}{2}$ grain.
Aconiti Tinctura	1 to 2½ minims.	1 to 3 minims.
Aloes Tinctura	4 fluidrachms.	1½ fluidrachm.
Arseniosi Acidi Liquor	5½ minims.	5 minims.
Arsenitis Potassii Liquor	5½ minims.	5 minims.
Asafœtidæ Tinctura	50 minims.	40 minims.
Calumbæ Tinctura	2 fluidrachms.	3 fluidrachms.
Camphoræ Spiritus	40 minims.	50 minims.
Cannabis Indicæ Tinctura	10 minims.	18 minims.
Cantharidis Tinctura	10 minims.	7 minims.
Capsici Tinctura	20 minims.	15 minims.
Catechu Tinctura	½ to 2 fluidrachms.	.....
Catechu Tinctura Comp	.....	1 fluidrachm.
Cinchonæ Tinctura	2 fluidrachms.	2½ fluidrachms.
Conii Foliorum Extractum	1 to 4 grains.	.....
Conii Fructus Extractum	.....	¼ to 1 grain.
Conii Foliorum Tinctura	½ to 1 fluidrachm.	.....
Conii Fructus Tinctura	.....	15 to 30 minims.
Cubebæ Tinctura	1 fluidrachm.	1½ fluidrachm.
Ergotæ Vinum	2½ fluidrachms.	2 fluidrachms.
Ferri Chloridi Tinctura	20 minims.	18 minims.
Guajaci Tinctura	40 minims.	50 minims.
Guajaci Tinctura Ammoniata	40 minims.	50 minims.
Humuli Tinctura	1½ fluidrachm.	1 fluidrachm.
Lobeliæ Acetum	15 minims.	20 minims.
Lobeliæ Tinctura	40 minims.	30 minims.
Menthæ Piperitæ Spiritus	20 minims.	15 minims.
Nucis Vomicæ Tinctura	20 minims.	35 minims.
Opii Acetum	6 minims.	10 minims.
Opii Tinctura	12 minims.	10 minims.
Opii Tinctura Deodorata	12 minims.	10 minims.
Opii Pulvis	1 grain.	1 grain.
Opii Vinum	6 minims.	10 minims.
Quassiæ Tinctura	1½ fluidrachm.	1 fluidrachm.
Rhei Vinum	2 fluidrachms.	3 fluidrachms.
Sanguinariæ Acetum	10 minims.	13 minims.
Scillæ Acetum	15 minims.	20 minims.
Serpentariæ Tinctura	30 minims.	40 minims.
Stramonii Tinctura	10 minims.	15 minims.
Valerianæ Tinctura	65 minims.	50 minims.
Valerianæ Tinctura Ammoniata	65 minims.	50 minims.
Veratri Viridis Tinctura	5 minims.	6 minims.
Zingiberis Tinctura	1 fluidrachm.	1½ fluidrachm.

APPROXIMATE MEASURES.

In apportioning the doses for the use of the patient it is still the custom with many physicians to make use of the spoons, etc., found in every household, and which vary considerably in size. It would be much better if each household were provided with a "medicine-glass," accurately graduated, so that the medicines could be properly dispensed.

The measures commonly used are called "approximate measures," because they are not accurate. The most useful are enumerated below, and are generally agreed to be as follows :

A teacupful	=	f ℥ iv.
A wineglassful	=	f ℥ ij.
A tablespoonful	=	f ℥ ss.
A dessertspoonful	=	f ʒ ij.
A teaspoonful	=	f ʒ j.
A drop	=	$\frac{1}{3}$ to $1\frac{1}{2}$ minim.

The following equivalents stated in metric weights are probably more nearly in accord with the actual sizes of the spoons, etc., in most common use :

One drop is in weight about five centigrams.
One teaspoonful = five fluigrams or cubic centimeters.
One dessertspoonful = ten fluigrams or cubic centimeters.
One tablespoonful = twenty fluigrams or cubic centimeters.
One wineglassful is about sixty fluigrams or cubic centimeters.

When a spoonful is ordered to be taken the patient seldom gets the amount intended for him because he will not quite fill the spoon for fear of spilling some of the contents. If he has no medicine-glass he should be told to fill the spoon brimful while holding it over a wineglass, and then to pour the contents into the glass and take his dose from the latter. By so doing he can take his full dose without spilling any of the medicine.

WEIGHTS AND MEASURES.

In the United States drugs and chemicals are usually bought and sold in quantities expressed in avoirdupois weight or in wine measure.

Troy weight is no longer officially recognized in this country; but it is still used in writing and dispensing prescriptions. The abolition of fluid measures in the pharmacopœial working formulæ should serve to help abolishing the troy weights for any and all purposes, and it is to be hoped that in all cases where metric weights and measures are not used the commercial weights and measures of the country will be employed.

As druggists buy and sell by avoirdupois pounds and ounces, and by wine gallons, pints, and fluidounces, the same weights and measures should hereafter be used in all pharmaceutical manipulations and in writing prescriptions by all who do not adopt the still more simple metric system. In fact, ounces, drachms, and scruples ought to be dropped in prescription writing, and either grams or grains substituted. This would eliminate one of the sources of the existing confusion between the several systems, and would relieve the druggist of the necessity of keeping three kinds of weights.

The Incongruities of the Old Systems.

A troy ounce of pure water measures about 505 minims; an avoirdupois ounce measures about 460 minims. One grain measures about $1\frac{1}{20}$ minim, and one minim weighs about $\frac{95}{100}$ grain. One U. S. fluidounce weighs about $456\frac{1}{3}$ grains, whereas one avoirdupois ounce is only $437\frac{1}{2}$ grains, and a troy ounce is 480 grains. It will therefore be seen that no simple relation exists between any of the units of the old systems of weights and measures. In other words, a pint is not a pound, an ounce is not equal to a fluidounce, a drachm is not commensurate with a fluidrachm, and a minim is not a grain.

In England, where imperial fluid measures are the law, one minim is only $\frac{9}{10}$ grain.

The Weights and Measures Used in the Companion.

In all the working formulæ of the Pharmacopœia which are translated in the Companion we have necessarily substituted grams for parts by weight, because the system of parts by weight is not, as claimed by some, equally applicable to all systems of weights and measures alike, but is far more conveniently used in connection with the metric system, in which the unit of weight bears so simple a relation to the unit of fluid measure that the absolute weight of one liter of any liquid when expressed in grams gives at the same time the specific gravity of that liquid to three decimal places.

At the same time several of the pharmacopœial working formulæ, as those for fluid extracts, pills, troches, etc., actually refer to metric weights (and measures) so that the adoption of that system in the Companion became doubly necessary.

In translating the pharmacopœial working formulæ into the more familiar forms the Companion *refers to avoirdupois weight and U. S. fluid measures only.* Thus, troy weight and imperial fluid measures are never used in the Companion.

In most cases, except in stating doses, the quantities given in parentheses are the exact equivalents of the metric quantities preceding the parentheses ; but in some cases, where weights only are used, the equivalents are approximate only, although the proportions between the several ingredients are unchanged.

The System of Parts by Weight.

The Pharmacopœial Convention of 1880 by a close vote adopted the system of parts by weight for the working formulæ of the Pharmacopœia, except for fluid extracts, in reference to which the Revision Committee was authorized to use its discretion. The Committee of Revision, in carrying out the instructions of the Convention, availed itself of the discretionary power given by retaining the volumetric method for fluid extracts, although curiously mixed with parts by weight in details which could have been more clearly stated had definite quantities been referred to, using weights for solids and measures for liquids. The formulæ for fluid extracts, accordingly, present a rather incongruous aspect in addition to being exceptionally awkward to work with. In all the other pharmacopœial working formulæ the use of fluid measures has been abandoned, the quantities of liquids and solids are stated in parts by weight only, and the strength of liquid pharmacopœial preparations is fixed according to certain mathematical proportions by weight.

That all liquid medicines must to the end of time be administered to the patient in doses by measure is an incontrovertible fact. Now, as the medicine must be given by teaspoonfuls, tablespoonfuls, or other stated quantities, measured out by means of a medicine-glass, or spoons, or other vessels, the physician necessarily constructs his prescription accordingly. He makes up his mind what he will give in each dose, how many doses he wants put up, and what the dose of the mixture must be, and then he makes the bulk of the whole mixture contain the requisite number of doses by measure, such as the patient must take them. If he adds water, or syrup, or some other diluent or vehicle to make up a certain total bulk, the task is considerably simplified and greater accuracy arrived at because the simpler he makes the matter for the patient or the nurse the better. He might prescribe all the ingredients in the mixture by weight, if he is able to guess what its final volume will be, or he might prescribe all the active ingredients by weight and direct that the final volume be made up to a certain volume by adding water, syrup, or whatever liquid may be preferred ; but the fact still remains that he must know how much by measure the patient is to take of the mixture. As this fact cannot be changed, the Pharmacopœia and the practice of pharmacy should be in harmony with it, unless there are grave reasons for ignoring it.

The only question worth considering in this connection is that of relative accuracy. All other advantages claimed for "parts by weight," such as universality, clearness, etc., may be more conveniently gained by the adoption of the metric system, fluid measures included.

It is claimed that weighing is more accurate than measuring. This is quite true in general. When conducted with exceptionally good instruments and with extreme care, weighing is more accurate ; and in manufacturing, where large quantities of liquids are handled, measuring is both less convenient and less accurate than weighing. But the question now is : Are the results obtained by weighing, as conducted in pharmacy and with fairly sufficient skill, care, and good instruments, so much more accurate than the results obtained by fairly careful measuring with good graduates that we are justified in changing the present practice, which is in harmony with the manner in which liquid medicines are administered, and adopting instead a method of preparing the medicines which is out of harmony with the mode of using them ?

If the medicine *is* to be taken by teaspoonfuls, why not prescribe it by teaspoonfuls ? And if it is to be prescribed by teaspoonfuls, why not make it so that we can ascertain with a minimum of labor how much of the active substance a teaspoonful represents ?

We believe that in all ordinary pharmaceutical manipulations

measures are quite as accurate as weights, and that the results arrived at by measuring are sufficiently correct for the purposes of medicine.

The most suitable dose of any drug, to be given in any case, cannot be fixed within narrow limits. When the physician prescribes fluid extract of digitalis he does not try to predict beforehand whether three minims, or four minims, or three drops, or 0.25 C.c. is the most appropriate quantity to be given in each dose in that particular case. That would be simply absurd. All he can do is to guess pretty nearly right and watch the results, and then increase or decrease the frequency or size of the dose as the case may require. The dose of Epsom salt is generally supposed to be about one ounce; would $\frac{7}{8}$ ounce or $1\frac{1}{8}$ ounce make a material difference? The dose of opium is said to be one grain; if our grain were $\frac{1}{6}$ smaller or larger than it is, would not the dose of opium still be one grain?

We make our tinctures, etc., represent 5, 10, 15, 20, 25, 40, or 50 per cent. of their weight of the drug, and these proportions have apparently no reference whatsoever to their potency or their dose, for we have concentrated tinctures of potent drugs and very weak tinctures of comparatively harmless substances. Now, the doses as generally stated or given are not odd fractions, or numbers of minims or grains, but in this as in other things we instinctively avoid practically intractable numbers which are unfamiliar and distasteful to the mind only because of their difficult divisibility. Hence, if we change the strength of tincture of rhubarb from ten per cent. to twelve per cent., that change is not at all likely to affect the quantity of the preparation which will be prescribed in one dose.

When these points are considered, and we further bear in mind the fact that the quality of medicines, as generally found, varies extremely, one lot of the drug or preparation being good, while another may be only half as active, or even absolutely worthless, the possible variations in strength which may result from the inaccuracies of measuring as compared with weighing seem ridiculously trifling.

The Pharmacopœia deems measuring accurate enough to introduce volumetric methods of testing. With the exercise of reasonable care, measuring is certainly accurate enough in pharmacy as well as in volumetric chemical analysis. Without care weighing is less accurate than measuring.

We are confident that these opinions are shared by a majority of the physicians and pharmacists of the United States, and that the system of parts by weight will not stand in this country longer than until the meeting of the next Pharmacopœial Convention (in 1890).

That parts by weight should have been adopted in Germany, Sweden, and other countries where fluid measures were never used in the pharmacopœias, is natural. The physicians in those countries are taught to prescribe exclusively by weight. In this country and in England, however, it is hardly possible that the practical common sense of the prevailing practice will ever be sacrificed for the imaginary advantages of "parts by weight."

How to Weigh Liquids.

Place the empty bottle, or other vessel, on one scale. On the opposite scale put a suitable wide-mouth vial to hold enough fine shot or clean sand to counterbalance the bottle. When equilibrium has been restored by pouring enough shot or sand into the wide-mouth vial, place the requisite weights on the scale that contains the *tare*, consisting of the vial of shot, and pour the liquid carefully into the bottle until equilibrium is again restored.

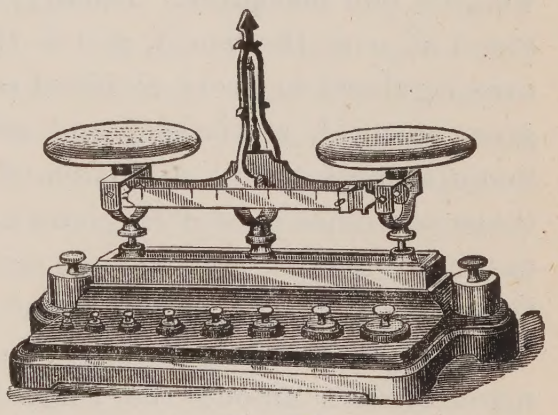


Fig. 656.

For those who can afford it, Troemner's new scale for weighing liquids is an excellent instrument, being both accurate and convenient. A figure of it is here given. The price, we believe, places it within the reach of every pharmacist, and it renders the use of shot or sand or any other extemporaneous contrivance superfluous, as a special counterpoise beam is attached to the scales.

The Metric System.

The arithmetic of the whole civilized world is decimal. We count from one to ten, and then begin a new series of another ten units, and so on. For this reason it is that we can compute money in dollars and cents, which are in harmony with our arithmetic, much more naturally and rapidly than we can compute pounds, shillings, and pence, which are *not* in harmony with our arithmetic.

For precisely the same reason the metric system of weights and measures is easier and more natural to us than pounds, ounces, drachms, and grains, and pints, fluidounces, fluidrachms, and minims, or any other weights and measures, which are not decimal. When stated in a decimal system of weights and measures, the quantities can be added up as easily as if they were columns of dollars and cents ; prices can be com-

puted with the least possible amount of labor, and the relative proportions of the several ingredients in a formula can be seen more clearly than when any other system is used.

But great as these practical advantages are, there are other and greater advantages gained by the use of the metric system. To know the specific gravity of any liquid is at once to know the weight of a liter of it without any computation whatsoever. If the specific gravity of glycerin be 1.250, then one liter of glycerin weighs 1,250 grams. Per contra, to ascertain the specific gravity of any liquid, it is only necessary to find the weight in grams of one, ten, or one hundred cubic centimeters of it. These things cannot be done in any other system of weights and measures. Finally, the metric system is known and understood all over the world, and is the only system of weights and measures legalized in every civilized country on the globe, and used for all governmental, statistical, and scientific purposes, and in the arts and manufactures, to the exclusion of all other weights and measures in all these countries except England and the United States, where, although expressly legalized, it has not made as rapid progress as it will make in the near future. It is safe to predict that when the metric system of weights and measures shall have been introduced in science, arts, and manufactures among the English-speaking peoples, it will rapidly become the only system used even in the common transactions of everyday life.

Description of the Metric System.

It is based on an unchangeable quantity—the quadrant of the earth. One ten-millionth part of the quadrant, called a METER, is the primary unit of measurement of the whole system. The METER is the standard of *linear measurement* of the metric system. It is equal to 39.370432 inches, or about ten per cent. longer than our yard.

The metric unit of *fluid measure* is the LITER—the cube of one decimeter ($\frac{1}{10}$ meter) or 1,000 cubic centimeters. It is equal to 33.8149 (or about 34) U. S. fluidounces, or 0.264179 wine gallon.

The CUBIC CENTIMETER is equal to 16.231 U. S. minims.

The unit of weight of the metric system is the GRAM, which is the weight of one cubic centimeter of pure water at its greatest density. The gram is equal to 15.43234874 grains. To memorize this number to the extent of three decimals write the figures 5, 4, 3, 2 in this regular descending order, and then place the figure 1 before the figure 5 and the decimal point after the figure 5 ; thus, 15.432.

The Names of the Metric Units.

The names and terms used to designate the units of the metric system, and the multiples and subdivisions of these units are, of course, no essential part of the system itself. The terms meter, liter, gram, and cubic centimeter are easy enough, are probably as suitable as any that could have been adopted, and are now universally understood ; but if the units themselves and their relation to each other are the same, the adoption of other names for the units would not alter the system itself in the least.

Many object to the adoption of the metric system on the ground that the prefixes used in connection with the units are unnecessary and unfamiliar. These prefixes are in fact nothing but numerals and need not be used at all. They are as follows : *Milli—*, which means one one-thousandth part ; *centi—*, which means one one-hundredth part ; *deci—*, which means one-tenth part ; *deka—*, which means ten ; *hekto—*, which means one hundred ; *kilo—*, which means one thousand ; and *myria—*, which means ten thousand. But it is easier to say "ten grams" than "one *dekagram*," or to say "*one hundred grams*" instead of "*one hektogram*," etc., and it means precisely the same thing. As for the subdivisions of the metric units, it seems to be sufficient to let the word *cent* stand for one-hundredths, and the word *mill* for one-thousandths.

The only metric units necessary in medicine and pharmacy are the gram and the cubic centimeter. Now as one cubic centimeter of water weighs exactly one gram, this intimate relationship between the two units is very happily expressed by substituting the word *fluigram* for the word cubic centimeter, as proposed by Mr. Alfred B. Taylor, of Philadelphia. Then

All that is essential of the metric system in medicine and pharmacy is to learn what a *gram* is, and what a *fluigram* (or cubic centimeter) is :

1 *gram* is equal to about **15** *grains*, and
1 *fluigram* is equal to about **15** *minims*.

Hence,

1 *drachm* is equal to 4 *grams*, and
1 *fluidrachm* is equal to 4 *fluigrams*.

The one-hundredth part of a gram (or centigram, also called a *cent*) is equal to about $\frac{1}{6}$ grain, and the one-thousandth part of a gram (or milli-gram, also called a *mill*) is equal to about $\frac{1}{64}$ grain.

Orthography and Abbreviations.

The names of the metric units are in France spelled *metre*, *litre*, and *gramme*. In other countries these terms have undergone such modifications as the language of each country naturally demanded.

The English spelling would be *meter*, *liter*, and *gram*; but when the question arose as to whether the French or the English orthography should be adopted in the Pharmacopœia, it seems that neither the one nor the other spelling was accepted, but a portion of each. The Pharmacopœia spells *meter*, *liter*, and *gramme*, instead of *meter*, *liter*, and *gram*, which would seem to be the more natural and easy orthography.

In abbreviating the terms *gram* and *cubic centimeter* write *Gm.* and *C.c.*, and in writing prescriptions in the metric system, put the numbers, always in Arabic numerals, *before*, and not after these abbreviations; thus, 10 Gm., 50 C.c., etc.

The term *fluigram* should be abbreviated *fGm.* When the terms *cent* and *mill* are used they should be spelled out in full.

Rules for Conversion.

1.—To convert grains into cents (or centigrams): multiply by 6.

2.—To convert grains into grams, or minims into fluigrams (cubic centimeters): divide by 15.

3.—To convert drachms into grams, or fluidrachms into fluigrams: multiply by 4.

A.—To convert cents (or centigrams) into grams: divide by 6.

B.—To convert grams into grains, or fluigrams (cubic centimeters) into minims: multiply by 15.

C.—To convert grams into drachms, or fluigrams (cubic centimeters) into fluidrachms: divide by 4.

A simple method of converting grains, cents (or centigrams) is as follows:

Assume the gram (written 1.00 *Gm.) to be equal to* 15 *or* 16 *grains. To convert any number of grains, less than* 16, *into centigrams, think what fraction that number is of* 15 *or* 16, *as may be most convenient, and then take that fractional part of* 1.00 *Gm. to express the metric equivalent.*

A few examples will make this clear.

1 grain $= \frac{1}{16}$ of 16 grains; $\frac{1}{16}$ of 1.00 Gm. = 0.06 Gm.
2 grains $= \frac{1}{8}$ of 16 grains; $\frac{1}{8}$ of 1.00 Gm. = 0.12 Gm.
3 grains $= \frac{1}{5}$ of 15 grains; $\frac{1}{5}$ of 1.00 Gm. = 0.20 Gm.

4 grains = $\frac{1}{4}$ of 16 grains; $\frac{1}{4}$ of 1.00 Gm. = 0.25 Gm.
5 grains = $\frac{1}{3}$ of 15 grains; $\frac{1}{3}$ of 1.00 Gm. = 0.33 Gm.
6 grains = $\frac{2}{5}$ of 15 grains; $\frac{2}{5}$ of 1.00 Gm. = 0.40 Gm.
8 grains = $\frac{1}{2}$ of 16 grains; $\frac{1}{2}$ of 1.00 Gm. = 0.50 Gm.
9 grains = $\frac{3}{5}$ of 15 grains; $\frac{3}{5}$ of 1.00 Gm. = 0.60 Gm.
10 grains = $\frac{2}{3}$ of 15 grains; $\frac{2}{3}$ of 1.00 Gm. = 0.66 Gm.
12 grains = $\frac{3}{4}$ of 16 grains; $\frac{3}{4}$ of 1.00 Gm. = 0.75 Gm.

From these equivalents any larger equivalents may be readily ascertained. This method is only approximately correct, but will be found convenient in prescription writing until the physician becomes familiar with metric quantities and *thinks* in that system so as to no longer need rules for converting.

Prices of Metric Quantities.

To find the price of 1,000 grams, multiply the price per pound by 2 and then add 10 per cent. to the product. Thus, if the price of a pound is $1.00, the price of 1,000 grams is $2.20.

To find the price of 1,000 cubic centimeters, multiply the price per pint by 2 and then add 5 per cent. Thus, if the price of a pint is $1.00, the price of 1,000 C.c. is $2.10.

Metric weights, graduates, and prescription vials can be readily obtained from Philadelphia or New York.

Equivalents.

The Meter.

		Exactly.	Approximately.
1 meter	is equal to	1.093623 yard.....	40 inches.
1 decimeter	" "	3.9370432 inches.....	4 inches.
1 centimeter	" "	0.3937043 inch	$\frac{2}{5}$ inch.
1 millimeter	" "	0.0393704 inch	$\frac{1}{25}$ inch.

(The U. S. five-cent nickel coin is 2 centimeters in diameter.)

The Yard.

	Exactly.	Approximately.
1 yard is equal to	0.914392 meter.....	90 centimeters.
1 foot " "	0.304797 meter.....	30 centimeters.
1 inch " "	0.025399 meter.....	25 millimeters.

Metric Fluid Measures.

		Exactly.		Approximately.
1 liter	is equal to	2.113433	Wine pints....	$2\frac{1}{8}$ Wine pints.
1 "	" "	33.814933	U. S. fl. ozs...	34 U. S. fl. ozs.
1 "	" "	1.761757	Imp. pint	$1\frac{3}{4}$ Imp. pint.
1 "	" "	35.23514	Imp. fl. ozs...	35 Imp. fl. ozs.
1 cubic centimeter	" "	16.23117	U. S. minims .	16 U. S. minims.
1 " "	" "	16.91286	Imp. minims .	17 Imp. minims.

Wine Measures.

		Exactly.		Approximately.
1 wine gallon	is equal to	3.7853	liters	3,800 C.c.
1 " "	" "	6.668	Imp. pints...	$6\frac{2}{3}$ Imp. pints.
1 " "	" "	133.3759	Imp. fl. ozs ..	$133\frac{1}{3}$ Imp. fl. ozs.
1 wine pint	" "	473.1637	C.c.....	475 C.c.
1 " "	" "	16.672	Imp. fl. ozs...	$16\frac{2}{3}$ Imp. fl. ozs.
1 U. S. fluid oz.	" "	29.5727	C.c.....	30 C.c.
1 " "	" "	1.042	Imp. fl. oz.....	$1\frac{1}{25}$ Imp. fl. oz.
1 U. S. fluidrachm	" "	3.6966	C.c.....	4 C.c.
1 " "	" "	62.52	Imp. minims.	$62\frac{1}{2}$ Imp. minims.
1 U. S. minim	" "	0.06161	C.c.....	$\frac{1}{16}$ C.c.
1 " "	" "	1.042	Imp. minim..	$1\frac{1}{25}$ Imp. minim.

Cubic Measure.

1 cubic centimeter is equal to 0.061025 cubic inch.
1 cubic inch is equal to 16.38662 C.c.

Imperial Measures.

		Exactly.		Approximately.
1 Imp. gallon	is equal to	4.5409	liters.....	$4\frac{1}{2}$ liters.
1 " "	" "	1.1996	Wine gallon ...	$1\frac{1}{5}$ Wine gallon.
1 " pint	" "	567.6152	C.c.....	560 C.c.
1 " "	" "	1.1996	Wine pint	$1\frac{1}{5}$ Wine pint.
1 " fl. oz.	" "	28.38076	C.c.....	28 C.c.
1 " "	" "	0.959694	U. S. fl. oz.. ...	$\frac{24}{25}$ fl. oz.
1 " "	" "	7.67755	U. S. fl. drs.....	$7\frac{2}{3}$ U. S. fl. drs.
1 " "	" "	460.6529	U. S. minims...	460 U. S. minims.
1 " minim	" "	0.05913	C.c.....	$\frac{1}{17}$ C.c.
1 " "	" "	0.959694	U. S. minim.....	$\frac{24}{25}$ U. S. minim.

Metric Weights.

	Exactly.	Approximately.
1 kilogram is equal to	2.2046 av. pounds	$2\frac{1}{5}$ av. lbs.
1 " " "	35.2739 av. ozs	$35\frac{1}{4}$ av. ozs.
1 " " "	15432.35 grains	
1 " " "	32.1507 troy ounces	32 troy ozs.
1 gram " "	15.432 grains	15 grains.
1 decigram " "	1.543 grain	$1\frac{1}{2}$ grain.
1 centigram " "	0.1543 grain	$\frac{1}{6}$ grain.
1 milligram " "	0.0154 grain	$\frac{1}{65}$ grain.

(The U. S. five-cent nickel coin weighs 5 Gm.)

Avoirdupois Weights.

	Exactly.	Approximately.
1 avoirdupois pound is equal to	453.5926 Gm.	450 Gm.
1 " " " "	14.5833 troy ozs	$14\frac{3}{5}$ troy ozs.
1 " ounce " "	28.3495 Gm.	$28\frac{1}{3}$ Gm.
1 " " " "	0.91146 troy oz	$\frac{9}{10}$ troy oz.
1 " " " "	437.5 grains	
1 " grain " "	0.0648 Gm.	65 milligrams.

Troy Weights.

	Exactly.	Approximately.
1 troy ounce is equal to	31.1035 Gm.	30 Gm.
1 " " " "	1.097 av. oz	$1\frac{1}{10}$ av. oz.
1 " " " "	480 grains	
1 " grain " "	0.0648 Gm.	65 milligrams.

SPECIFIC GRAVITY.

THE specific gravity of any substance is its relative weight as compared to an equal volume of water. Water being the adopted unit or standard of comparison, the specific gravity is expressed by the quotient obtained by dividing the weight of a given quantity, by measure, of the substance by the weight of an equal volume of water.

In pharmacy the determination of the specific gravities of liquids is of great importance. In most cases it is accomplished by one of two principal methods—either by means of a specific gravity bottle or by a hydrometer (areometer).

The specific gravity bottle is a bottle which holds a given quantity by weight of water—usually either 500 grains or 1,000 grains, or fifty grams—at the standard temperature 15° C. (59° F.). It is provided with a well-fitting ground glass stopper, perforated or not. The best bottle is that with a perforated stopper. It is generally accompanied by a metal weight equal to the weight of the empty bottle (counterpoise).

The clean and dry specific gravity bottle is filled with the liquid the specific gravity of which is to be ascertained, so that the level of the liquid is above the point to which the glass stopper will reach when inserted. The glass stopper is then slowly inserted, and after wiping off the liquid which is pushed out by the stopper, the whole is weighed. The weight of the contents of the bottle in grains is then divided by the number of grains of water it is capable of holding, or the weight of the contents of the bottle in grams is divided by the number of grams of water it holds. The result in either case is the specific gravity.

As the specific gravity is the relation of weight to volume, it is necessary to take into consideration the temperature, because the volumes of all bodies increase with an elevation of temperature, while their weights remain unchanged.

The standard temperature at which the specific gravities of liquids in the United States Pharmacopœia are to be determined is 15° C. (59° F.), except in the cases of alcohol and diluted alcohol, the specific

gravities of which are taken at 15.6° C. (60° F.), and at 25° C. (77° F.), respectively.

The specific gravities of alcohol and of mixtures of alcohol and water may also be taken by means of the ordinary U. S. Customs Revenue Alcoholometer, or by any other accurate hydrometer (or areometer).

SPECIFIC VOLUME.

Specific volume, as the opposite of specific gravity, was proposed by Oscar Oldberg, in a paper read before the American Pharmaceutical Association at Washington, in September, 1883.

The knowledge and use of the specific volumes of liquids is of great practical value in pharmacy and other arts, and in commerce. The term SPECIFIC VOLUME is proposed to express the relative volumes of substances in the same sense as the term "specific gravity" designates their relative weight.

The specific volumes of substances are inversely as their specific gravities. As the specific gravity of a liquid or solid is the weight of a certain volume of that liquid or solid divided by the weight of an equal volume of water, so the specific volume of a substance is the quotient obtained by dividing the volume of a certain quantity by weight of that substance by the volume of an equal weight of water. It is, in other words, the quotient obtained by dividing unit by the specific gravity ;=

$$\frac{1}{\text{spec. gr.}} = \text{spec. vol.}$$

The product obtained by multiplying the specific gravity by the specific volume is, therefore, ONE.

Since the introduction of the method of "parts by weight" into the Pharmacopœia, the necessity of having some convenient means of converting quantities by weight into the corresponding quantities by measure, and of comparing weight and volume will be readily acknowledged. In our opinion, the use of specific volumes will answer that purpose perfectly, and better than any other method known.

In the official working formulæ for solutions, etc., the final product in grams when multiplied by the specific volume will at once give the actual volume in cubic centimeters. Thus, as the specific volume of solution of chloride of iron is 0.711, one thousand grams of that liquid measures 711 cubic centimeters.

As 100 avoirdupois ounces of water measures 96 fluidounces, the volume of 100 avoirdupois ounces of any other liquid may be obtained (expressed in fluidounces) by simply multiplying its specific volume by

96. Thus 100 avoirdupois ounces of solution of chloride of iron measures $0.711 \times 96 (= 68.3)$ fluidounces.

Since one gram is equal to one cubic centimeter, and one avoirdupois ounce is equal to one imperial fluidounce, when pure water is referred to, it follows that the absolute weight of any given quantity of a liquid expressed in grams, when multiplied by the specific volume, at once gives the number of cubic centimeters occupied by it, and the absolute weight expressed in avoirdupois ounces multiplied by the specific volume gives the measure of the liquid in imperial fluidounces.

Thus, as the specific volume of castor-oil is 1.042, therefore 1,000 grams of castor-oil will measure 1,042 cubic centimeters, and 1,000 avoirdupois ounces of it will measure 1,042 *imperial* fluidounces. But 1,000 avoirdupois ounces of castor-oil will measure $1{,}042 - \times 96 (=$ 1,000) *U. S.* fluidounces.

The following tables of specific gravities and specific volumes will be found useful.

Table showing the Specific Gravities and the Specific Volumes of the Pharmacopœial and some other liquid preparations for which the Specific Gravities are officially given. Temperature 15° *C.* (59° *F.*), *except in the cases of Alcohol, Diluted Alcohol, and Distilled Water.*

LIQUID.	WEIGHT.			VOLUME.		
	Specific gravity.	Weight of 1,000 C.c. in grams.	Weight of 100 fl.ozs. in avoirdupois ounces.	Specific volume.	Volume of 1,000 Gm. in C.c.	Volume of 100 avoirdupois ozs. in fl.ozs.
Acid. Acet.	1.0480	1,048	109.1	.954	954	91.6
Acid. Acet. Dil.	1.0083	1,008.3	105.0	.992	992	95.2
Acid. Hydrobrom., 34 per cent.	1.303	1,303	135.7	.767	767	73.6
Acid. Hydrobrom. Dil.	1.077	1,077	112.2	.928	928	89.1
Acid. Hydrochlor.	1.160	1,160	120.8	.862	862	82.8
Acid. Hydrochlor. Dil.	1.049	1,049	109 3	.953	953	91.5
Acid. Lactic	1.212	1,212	126.2	.825	825	79.2
Acid. Nitricum	1.420	1,420	148.0	.704	704	67.6
Acid. Nitricum Dil.	1.059	1,059	110.3	.944	944	90.6
Acid. Oleicum	.910	910	83.4	1.099	1,099	119.9
Acid. Phosphoricum	1.347	1,347	140.3	.742	742	71.2
Acid. Phosphoricum Dil.	1.057	1,057	110.1	.945	945	90.7
Acid. Sulphuricum	1.840	1,840	191.7	.543	543	52.2
Acid. Sulphuricum Dil.	1.067	1,067	111.1	.937	937	90.0
Æther	.750	750	78.1	1.333	1,333	128.0
Æther Fortior	.725	725	75.5	1.379	1,379	132.4
Alcohol, at 15.6° C. (60° F.)	.820	820	85.4	1.219	1,219	117.0

Table of Specific Gravities and Specific Volumes.—(Continued.)

LIQUID.	WEIGHT.			VOLUME.		
	Specific gravity.	Weight of 1,000 C.c. in grams.	Weight of 100 fl ozs. in avoirdupois ounces.	Specific volume.	Volume of 1,000 Gm. in C.c.	Volume of 100 avoirdupois ozs. in fl. ozs.
Alcohol, at 25° C. (77° F.)	.812	812	84.6	1.231	1,231	118.1
Alcohol Dil., at 15.6° C. (60° F.)	.928	928	96.7	1.077	1,077	103.4
Alcohol Dil., at 25° C. (77° F.)	.920	920	95.8	1.087	1,087	104.4
Aqua Destillata, at 4° C	1.000	1,000	104.17	1.000	1,000	96.0
Aqua Ammoniæ	.959	959	99.9	1.043	1,043	100.1
Aqua Ammoniæ Fortior	.900	900	93.75	1.111	1,111	106.7
Benzinum	.670	670	69.8	1.493	1,493	143.3
Carbonei Bisulphidum	1.272	1,272	132.5	.786	786	75.5
Chloroformum Purific	1.488	1,488	155.0	.672	672	64.5
Chloroformum Venale	1.470	1,470	153.1	.680	680	65.3
Glycerinum	1.250	1,250	130.1	.800	800	76.8
Liquor Ferri Acet	1.160	1,160	120.8	.862	862	82.8
Liquor Ferri Chloridi	1.405	1,405	146.4	.711	711	68.3
Liquor Ferri Tersulph	1.320	1,320	137.5	.757	757	72.7
Liquor Potassæ	1.036	1,036	107.9	.965	965	92.6
Liquor Sodæ	1.059	1,059	110.3	.944	944	90.6
Mel	1.333	1,333	138.8	.750	750	72.0
Oleum Adipis	.900	900	93.75	1.111	1,111	106.7
Oleum Amygd. Expr	.917	917	95.5	1.091	1,091	104.7
Oleum Aurantii Cort	.860	860	89.5	1.163	1,163	111.6
Oleum Bergamii	.875	875	91.1	1.143	1,143	109.7
Oleum Caryophylli	1.050	1,050	109.4	.952	952	91.4
Oleum Copaibæ	.890	890	92.7	1.123	1,123	107.8
Oleum Cubebæ	.920	920	95.8	1.087	1,087	104.4
Oleum Eucalypti	.900	900	93.75	1.111	1,111	106.7
Oleum Gaultheriæ	1.173	1,173	122.2	.852	852	81.8
Oleum Gossypii Seminis	.925	925	96.4	1.081	1,081	103.8
Oleum Lavandulæ	.890	890	92.7	1.123	1,123	107.8
Oleum Limonis	.850	850	88.5	1.176	1,176	112.9
Oleum Lini	.936	936	97.5	1.068	1,068	102.5
Oleum Menthæ Pip	.900	900	93.75	1.111	1,111	106.7
Oleum Morrhuæ	.920	920	95.80	1.087	1,087	104.4
Oleum Olivæ	.916	916	95.4	1.092	1,092	104.8
Oleum Ricini	.960	960	100.0	1.042	1,042	100.0
Oleum Rosmarini	.900	900	93.75	1.111	1,111	106.7
Oleum Sassafras	1.091	1,091	113.6	.917	917	88.0
Oleum Sesami	.918	918	95.6	1.089	1,089	104.5
Oleum Terebinthinæ	.862	862	89.8	1.160	1,160	111.4
Spir. Ætheris Nitrosi	.824	824	85.8	1.214	1,214	116.5
Spir. Frumenti	.920	920	95.8	1.087	1,087	104.4
Spir. Vini Gallici	.930	930	96.9	1.075	1,075	103.1
Syrupus [Simplex]	1.310	1,310	136.4	.763	763	73.3
Vinum Album	1.000	1,000	104.17	1.000	1,000	96.0
Vinum Rubrum	1.000	1,000	104.17	1.000	1,000	96.0

Table showing the Alcoholic Strengths (per cent., by weight and by measure), the Specific Gravities, the Specific Volumes, etc., of Alcohol and of Mixtures of Alcohol and Water, at 15.6° C. (60° F.).

	Percentage of absolute alcohol.		Weight.			Volume.		
	By weight.	By volume.	Specific gravity.	Weight of 1,000 C.c. in grams.	Weight of 100 fluidounces in avoirdupois ozs.	Specific volume.	Volume of 1,000 grams in cubic centimeters.	Volume of 100 avoirdupois ozs. in fluidounces.
Alcohol, U. S. P., 1880.....	91.00	94.00	.8200	820.0	85.42	1.2195	1,219.5	117.07
A mixture of—								
19 ozs. alcohol and 1 oz. water by weight	86.45	90.61	.8319	831.9	86.66	1.2019	1,201.9	115.39
18 " " 1 " "	86.21	90.41	.8326	832.6	86.73	1.2010	1,201.0	115.30
17 " " 1 " "	85.94	90.21	.8333	833.3	86.80	1.2000	1,200.0	115.20
16 " " 1 " "	85.65	89.99	.8340	834.0	86.88	1.1990	1,199.0	115.10
15 " " 1 " "	85.31	89.72	.8349	834.9	86.97	1.1977	1,197.7	114.98
14 " " 1 " "	84.66	89.22	.8366	836.6	87.15	1.1953	1,195.3	114.75
13 " " 1 " "	84.50	89.09	.8370	837.0	87.19	1.1947	1,194.7	114.69
12 " " 1 " "	84.00	88.70	.8382	838.2	87.31	1.1933	1,193.3	114.56
11 " " 1 " "	83.62	88.40	.8392	839.2	87.42	1.1916	1,191.6	114.39
10 " " 1 " "	82.73	87.70	.8415	841.5	87.66	1.1883	1,188.3	114.08
9 " " 1 " "	81.90	87.04	.8437	843.7	87.89	1.1852	1,185.2	113.78
8 " " 1 " "	80.88	86.22	.8462	846.2	88.15	1.1817	1,181.7	113.44
7 " " 1 " "	79.63	85.18	.8492	849.2	88.46	1.1775	1,177.5	113.04
6 " " 1 " "	78.00	83.85	.8533	853.3	88.89	1.1719	1,171.9	112.50
5 " " 1 " "	75.83	82.01	.8585	858.5	89.43	1.1648	1,164.8	111.82
4 " " 1 " "	72.80	79.37	.8654	865.4	90.15	1.1555	1,155.5	110.93
7 " " 2 " "	70.77	77.57	.8702	870.2	90.65	1.1491	1,149.1	110.31
3 " " 1 " "	68.25	75.34	.8763	876.3	91.28	1.1411	1,141.1	109.55
5 " " 2 " "	65.00	72.38	.8840	884.0	92.08	1.1312	1,131.2	108.60
2 " " 1 " "	60.66	68.32	.8940	894.0	93.12	1.1185	1,118.5	107.38
5 " " 3 " "	56.88	64.69	.9028	902.8	94.04	1.1076	1,107.6	106.33
3 " " 2 " "	54.60	62.43	.9077	907.7	94.55	1.1017	1,101.7	105.76
4 " " 3 " "	52.00	59.84	.9135	913.5	95.16	1.0947	1,094.7	105.09
5 " " 4 " "	50.55	58.39	.9169	916.9	95.51	1.0906	1,090.6	104.70
6 " " 5 " "	49.64	57.45	.9190	919.0	95.73	1.0881	1,088.1	104.46
1 " " 1 " "	45.50	53.20	.9281	928.1	96.68	1.0775	1,077.5	103.44
6 " " 7 " "	42.00	49.50	.9356	935.6	97.46	1.0688	1,068.8	102.60
5 " " 6 " "	41.36	48.81	.9369	936.9	97.59	1.0673	1,067.3	102.46
4 " " 5 " "	40.44	47.82	.9387	938.7	97.78	1.0653	1,065.3	102.27
3 " " 4 " "	39.00	46.26	.9416	941.6	98.08	1.0620	1,062.0	101.95
5 " " 7 " "	37.92	45.08	.9435	943.5	98.28	1.0599	1,059.9	101.75
2 " " 3 " "	36.40	43.39	.9463	946.3	98.57	1.0568	1,056.8	101.45
5 " " 8 " "	35.00	41.84	.9490	949.0	98.85	1.0537	1,053.7	101.16
3 " " 5 " "	34.13	40.91	.9508	950.8	99.03	1.0518	1,051.8	100.97
1 " " 2 " "	30.33	36.57	.9572	957.2	99.81	1.0447	1,044.7	100.29
2 " " 5 " "	26.00	31.57	.9638	963.8	100.39	1.0376	1,037.6	99.61
1 " " 3 " "	22.75	27.75	.9681	968.1	100.84	1.0329	1,032.9	99.16
1 " " 4 " "	18.20	22.31	.9738	973.8	101.44	1.0270	1,027.0	98.59
1 " " 5 " "	15.16	18.67	.9776	977.6	101.83	1.0229	1,022.9	98.20
1 " " 6 " "	13.00	16.05	.9802	980.2	102.10	1.0202	1,020.2	97.94

APPENDIX.

MANY pharmacists prepare their own elixirs and other similar preparations in preference to dispensing those furnished by manufacturers. The following practical formulæ are accordingly inserted in the COMPANION in the hope that they will be found useful. When intelligently followed these formulæ yield entirely satisfactory results, provided good materials and careful manipulations are used.

The strengths of these preparations, respectively, are, as a rule, in accordance with the most generally accepted standards, corresponding with the goods of that character sold by the several principal manufacturers.

Nearly all elixirs should be allowed to stand several days before being finally filtered for use. In filtering them, the use of magnesium carbonate, precipitated chalk, and other similar mediums should never be resorted to, and no such filtering medium is at all necessary.

ELIXIRS.

Simple Elixir.—The elixir of orange of the Pharmacopœia will answer very well for most purposes. Whenever it is deemed necessary to add other aromatics or flavoring agents, the judicious use of tincture of vanilla, syrup of tolu, rose-water, orange-flower water, fluid extract of cardamom, fluid extract of coriander, Baker's best chocolate, etc., will be found effective as well as convenient. The use of volatile oils is not nearly so convenient as the agents just enumerated. Whenever volatile oils are used, those of sweet orange, coriander, cinnamon, lemon (and cloves, caraway, and nutmeg) are generally sufficient. The volatile oils should be distributed on clean picked cotton, as in the official process for making "Aquæ Aromaticæ" (see that title). The use of a layer of dry, loose cotton in the throat of the funnel or percolator, next a layer of cotton wetted with some of the elixir, then the cotton impregnated with the volatile oils, and finally a top layer of loose, dry cotton, all to be weighted down with clean, small pebbles, will insure uniform success.

The choice of flavoring agents is omitted in the formulæ here given, because it is literally a matter of taste.

To color the elixir red, use a mixture of equal parts, by measure, of caramel and tincture of cudbear.

Elixir of Arsenic.—Mix 30 C.c. (1 fl.oz.) Fowler's solution with 470 C.c. (16 fl.ozs.) simple elixir. Color it pale red. Each teaspoonful (5 C.c.) contains 0.30 C.c. (about 5 minims) of Fowler's solution.

Elixir of Bismuth.—Dissolve 25 grams (386 grs.) citrate of bismuth and ammonium in 200 C.c. (6¾ fl.ozs.) boiling water, adding carefully enough water of ammonia, drop by drop, to give the solution a faintly alkaline reaction. Then add 800 C.c. (27 fl.ozs.) simple elixir, and filter. Each teaspoonful (5 C.c.) contains 12.5 centigrams (2 grs.) citrate of bismuth and ammonium.

Elixir of Bismuth and Strychnine.—Dissolve 20 centigrams (3 grs.) strychnine in 30 C.c. (1 fl.oz.) alcohol, by the aid of heat. Mix the solution with 970 C.c. (33 fl.ozs.) elixir of bismuth. Each teaspoonful (5 C.c.) contains 12.5 centigrams (2 grs.) citrate of bismuth and ammonium, and 1 milligram ($\frac{1}{64}$ gr.) strychnine.

Elixir of Bromide of Ammonium.—Dissolve 33 grams (1 oz. 72 grs.) bromide of ammonium in 500 C.c. (17 fl.ozs.) simple elixir. Each teaspoonful (5 C.c.) contains 33 centigrams (5 grs.) bromide of ammonium.

Elixir of Bromide of Lithium.—Dissolve 33 grams (1 oz. 72 grs.) lithium bromide in 500 C.c. (17 fl.ozs.) simple elixir. Each teaspoonful (5 C.c.) contains 33 centigrams (5 grs.) lithium bromide.

Elixir of Bromide of Potassium.—Dissolve 66 grams (2 ozs. 144 grs.) bromide of potassium in 500 C.c. (17 fl.ozs.) simple elixir. Each teaspoonful (5 C.c.) contains 66 centigrams (10 grs.) potassium bromide.

Elixir of Calisaya (*Elixir of Cinchona*).—To make an elixir of calisaya, each teaspoonful of which represents 33 centigrams (5 grs.) good yellow cinchona (or calisaya) bark, the following formula is the most rational and proper, assuming that the calisaya bark represented by the elixir is one containing about 6 per cent. total alkaloids.

To make an elixir of cinchona from cinchona bark, removing the cinchotannic acid, is, in our opinion, a useless waste of time and labor. A detannated elixir of cinchona bark is in no way superior, but in several respects inferior to an elixir prepared as here described.

Dissolve 1.50 gram (23 grs.) sulphate of quinine, 1.50 gram (23 grs.) sulphate of cinchonine, 1 gram (15 grs.) sulphate of cinchonidine, and 50 centigrams (8 grs.) sulphate of quinidine in 240 C.c. (8 fl.ozs.) simple elixir by warming them together in a glass flask placed in hot water. When solution is effected, and still hot, add 760 C.c. (26 fl.ozs.) simple elixir. Filter. Color it deep red with a mixture of equal parts of caramel and tincture of cudbear.

Elixir of Calisaya with Bismuth.—Dissolve 25 grams (386 grs.) citrate of bismuth and ammonium in 100 C.c. ($3\frac{1}{3}$ fl.ozs.) boiling water; add carefully enough water of ammonia to give the solution a faintly alkaline reaction. Then add 915 C.c. (31 fl.ozs.) elixir of calisaya. Each teaspoonful (5 C.c.) contains 12.5 centigrams (2 grs.) citrate of bismuth and ammonium.

Elixir of Calisaya with the Compound Acid Phosphates.—Mix equal parts, by measure, of elixir of calisaya and compound syrup of phosphates.

Elixir of Calisaya with Iron (*Ferrated Elixir of Calisaya; Elixir of Calisaya with Pyrophosphate of Iron; Elixir of Cinchona with Iron; Ferrated Elixir of Cinchona*).—Dissolve 25 grams (386 grs.) pyrophosphate of iron in 60 C.c. (2 fl.ozs.) hot water, and add this solution to 940 C.c. (32 fl.ozs.) elixir of calisaya. Each teaspoonful (5 C.c.) contains 12.5 centigrams (2 grs.) pyrophosphate of iron.

Elixir of Calisaya, Iron, and Bismuth.—Dissolve 25 grams (386 grs.) pyrophosphate of iron in 60 C.c. (2 fl.ozs.) hot water, and add this solution to 940 C.c. (32 fl.ozs.) elixir of calisaya with bismuth.

Elixir of Calisaya, Iron, and Strychnine.—Dissolve 20 centigrams (3 grs.) strychnine in 30 C.c. (1 fl.oz.) alcohol, and add this solution to 970 C.c. (33 fl.ozs.) elixir of calisaya with iron. Each teaspoonful (5 C.c.) contains 1 milligram ($\frac{1}{64}$ gr.) strychnine.

Elixir of Calisaya and Pepsin.—Macerate 33 grams (1 oz. 72 grs.) saccharated pepsin with 120 C.c. (4 fl.ozs.) water for six hours; then add 915 C.c. (31 fl.ozs.) elixir of calisaya, shake thoroughly, and then filter. Each teaspoonful represents 33 centigrams (5 grs.) saccharated pepsin.

Elixir of Calisaya, Pepsin, and Bismuth.—Dissolve 25 grams (386 grs.) citrate of bismuth ammonium in 100 C.c. ($3\frac{1}{3}$ fl.ozs.) hot water, adding carefully enough water of ammonia, drop by drop, to

render the solution faintly alkaline. Then add it to 915 C.c. (31 fl.ozs.) elixir of calisaya and pepsin.

Elixir of Coca.—Mix 120 C.c. (4 fl.ozs.) fluid extract of erythroxylon and 360 C.c. (12 fl.ozs.) simple elixir, and add 3 C.c. (48 minims) solution of soda. Each tablespoonful (20 C.c.) represents 5 grams (77 grs.) coca leaves. This is three times the strength of the elixirs of coca usually sold ; but the increased strength here recommended is necessary in order to obtain the effects of the coca without giving inconveniently large doses. The dose of this preparation is a tablespoonful.

Elixir of Gentian.—Mix equal parts by measure of compound tincture of gentian and simple elixir.

Ferrated Elixir of Gentian.—Mix 30 C.c. (1 fl.oz.) fluid extract of gentian, 8 C.c. (2 fl.drs.) fluid extract of cardamom, and 440 C.c. (15 fl.ozs.) elixir of orange. Dissolve 6 grams (92 grs.) soluble phosphate of iron (U. S. P., 1880) in 30 C.c. (1 fl.oz.) hot water, and add this solution to the mixture. Each dessertspoonful (10 C.c.) contains 12.5 centigrams (2 grs.) phosphate of iron.

Elixir of Gentian with Tincture of Chloride of Iron.—Mix 30 C.c. (1 fl.oz.) fluid extract of gentian and 8 C.c. (2 fl.drs.) fluid extract of cardamom, with 440 C.c. (15 fl.ozs.) simple elixir. Add a mixture of 20 C.c. ($5\frac{1}{8}$ fl.drs.) tincture of chloride of iron and 30 C.c. (1 fl.oz.) solution of citrate of sodium. Let stand two or three weeks. Add about 125 grams ($\frac{1}{4}$ lb.) sugar. Each dessertspoonful (10 C.c.) contains 0.3 C.c. (5 minims) tincture of chloride of iron.

Elixir of Guarana.—Mix 60 C.c. (2 fl.ozs.) fluid extract of guarana, 75 C.c. ($2\frac{1}{2}$ fl.ozs.) alcohol, and 305 C.c. ($10\frac{1}{2}$ fl.ozs.) simple elixir. Flavor it with vanilla, chocolate, and a very minute quantity of cinnamon. Each teaspoonful (5 C.c.) represents 65 centigrams (10 grs.) guarana.

Compound Elixir of Liquorice (*Aromatic Elixir of Liquorice*). —Mix 150 grams (5 ozs. 127 grs.) liquorice root, and 100 grams (3 ozs. 230 grs.) wild cherry bark, both in No. 30 powder ; moisten the mixture, pack it in a percolator, macerate twenty-four hours, and then percolate with water mixed with one-tenth its volume of glycerin until 1,000 C.c. (34 fl.ozs.) percolate has been received.

Mix 25 grams (386 grs.) cinnamon, 25 grams anise, and 25 grams cardamom, all in No. 40 powder ; moisten the mixture with diluted alcohol, pack it in a percolator, and percolate with diluted alcohol until 1,000 C.c. (34 fl.ozs.) percolate has been obtained.

Mix the two percolates, add 500 C.c. (17 fl.ozs.) rose-water, and 400 grams (14 ozs. 48 grs.) sugar, and, when all the sugar has dissolved, shake the whole thoroughly together, and let it stand three or four weeks, after which filter. This is a very pleasant elixir, effective in masking the taste of bitter and other disagreeably tasting substances. It may be used advantageously as a vehicle in making other elixirs. The only disadvantage it presents is that unless it is allowed to stand several weeks before being used it will not be clear. It should be colored deep reddish-brown with caramel and tincture of cudbear.

Elixir of Pepsin and Bismuth.—Dissolve 25 grams (386 grs.) citrate of bismuth and ammonium in 100 C.c. (3⅓ fl.ozs.) hot water, adding enough water of ammonia, drop by drop, to give the solution a faintly alkaline reaction.

Mix 66 grams (2 ozs. 144 grs.) saccharated pepsin with 240 C.c. (8 fl.ozs.) water, and macerate six hours. Then add 1,770 C.c. (60 fl.ozs.) simple elixir. Finally add the solution of citrate of bismuth and ammonium. Filter. Each teaspoonful (5 C.c.) represents 33 centigrams (5 grs.) pepsin and 6.5 centigrams (1 gr.) citrate of bismuth and ammonium.

Elixir of Pepsin, Bismuth, and Iron.—Dissolve 25 grams (386 grs.) phosphate of iron (U. S. P., 1880) in 60 C.c. (2 fl.ozs.) hot water and add this to 915 C.c. (31 fl.ozs.) elixir of pepsin and bismuth. Each teaspoonful (5 C.c.) represents 33 centigrams (5 grs.) saccharated pepsin, 6.5 centigrams (1 gr.) citrate of bismuth and ammonium, and 12.5 centigrams (2 grs.) soluble phosphate of iron.

Elixir of Pepsin, Bismuth, and Strychnine.—Dissolve 20 centigrams (3 grains) strychnine in 30 C.c. (1 fl.oz.) alcohol, and add the solution to 970 C.c. (33 fl.ozs.) elixir of pepsin and bismuth. Each teaspoonful represents 33 centigrams (5 grs.) saccharated pepsin, 6.5 centigrams (1 gr.) citrate of bismuth and ammonium, and 1 milligram ($\frac{1}{64}$ gr.) strychnine.

Elixir of Pyrophosphate of Iron.—This is generally the elixir of calisaya with iron.

Elixir of Phosphate of Iron and Quinine.—Mix 125 C.c. (4¼ fl.ozs.) alcoholic solution of quinine (see under title "Quinine" in the COMPANION) with 440 C.c. (15 fl.ozs.) simple elixir. Dissolve 25 grams (386 grs.) soluble phosphate of iron (U. S. P., 1880) in 60 C.c. (2 fl.ozs.) hot water, and add to it 410 C.c. (14 fl.ozs.) syrup of tolu. Pour the

mixture containing the quinine gradually into the mixture containing the phosphate of iron, shaking the resulting mixture after each addition until all is mixed. Each teaspoonful (5 C.c.) contains 12.5 C.c. (2 grs.) soluble phosphate of iron and 6.3 centigrams (1 gr.) quinine.

Elixir of Phosphate of Iron, Quinine, and Strychnine.—Dissolve 20 centigrams (3 grains) strychnine in 30 C.c. (1 fl.oz.) alcohol and add the solution carefully and gradually to 970 C.c. (33 fl.ozs.) elixir of phosphate of iron and quinine, shaking the mixture after each addition. Each teaspoonful contains 12.5 centigrams (2 grs.) soluble phosphate of iron, 6.3 centigrams (1 gr.) quinine, and 1 milligram ($\frac{1}{64}$ gr.) strychnine.

Compound Elixir of Taraxacum.—Mix 50 C.c. ($1\frac{2}{3}$ fl.oz.) fluid extract of taraxacum, 12 C.c. (3 fl.drs.) fluid extract of gentian, and 940 C.c. (32 fl.ozs) compound elixir of liquorice.

Elixir of Valerianate of Ammonium.—Dissolve 15 grams (230 grs.) valerianate of ammonium in 1,000 C.c. (34 fl.ozs.) simple elixir, and add carefully, drop by drop, enough water of ammonia to make the liquid faintly alkaline to litmus paper. Color it with a mixture of equal parts by measure of caramel and tincture of cudbear.

BEEF, WINE, AND IRON.

Dissolve 50 grams (1 oz. 334 grs.) Liebig's extract of beef in 150 C.c. (5 fl.oz.) hot water. Add 600 C.c. (20 fl.ozs.) sherry wine and 120 C.c. (4 fl.oz.) simple syrup.

Dissolve 6.25 grams (100 grs.) soluble phosphate of iron (U. S. P., 1880) in 30 C.c. (1 fl.oz.) hot water, and add 15 C.c. ($\frac{1}{2}$ fl.oz.) solution of citrate of ammonium. Then add this mixture to the beef and wine, and finally enough water to make the whole measure 1,000 C.c. (34 fl.ozs.).

Each tablespoonful (20 C.c.) contains 12.5 centigrams (2 grs.) soluble phosphate of iron.

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Table showing the Volumes of certain Quantities by Weight of WATER, ALCOHOL, DILUTED ALCOHOL, GLYCERIN, and SYRUP. It also shows the relation of Avoirdupois to Metric Weight, and of U. S. Fluid Measures to Metric Measures.

QUANTITIES BY WEIGHT.		CORRESPONDING QUANTITIES BY MEASURE.									
		WATER.		ALCOHOL.		DILUTED ALCOHOL.		GLYCERIN.		SYRUP.	
Grams.	Avoirdupois weight.	Metric measure.	U. S. fluid measure.	Metric measure.	U. S. fluid measure.	Metric measure.	U. S. fluid measure.	Metric measure.	U. S. fluid measure.	Metric measure.	U. S. fluid measure.
	Grains.	C.c.	Minims.	C.c.	Minims.	C.c.	Minims.	C.c.	Minims.	C.c.	Minims.
1	15	1	16	1.23	20	1.07	17.2	0.80	13	0.76	12
2	31	2	32	2.47	40	2.15	34.4	1.60	26	1.53	25
3	46	3	48	3.70	60	3.22	51.6	2.40	39	2.29	37
4	62	4	65	4.94	80	4.30	68.8	3.20	52	3.05	50
5	77	5	81	6.17	100	5.37	86.0	4.00	65	3.81	62
6	92	6	97	7.40	120	6.45	103.2	4.80	78	4.58	75
7	108	7	113	8.64	140	7.52	120.4	5.60	91	5.34	87
8	123	8	129	9.87	160	8.60	137.6	6.40	104	6.10	100
9	139	9	146	11.10	180	9.67	154.8	7.20	117	6.87	112
10	154	10	162	12.34	200	10.75	172.0	8	130	7.63	125
15	231	15	243	18.51	300	16.13	258.0	12	195	11.45	187
20	309	20	324	24.67	400	21.50	344.0	16	260	15.3	249
25	386	25	405	30.84	1fl.oz.20m.	26.87	430.0	20	324	19.1	312
	ozs. grs.		fl.oz. min.		fl. ozs.		fl.oz.				
30	1 25	30	1 7	37.01	1.25	32.25	1.09	24	389	22.9	374
35	1 103	35	1 88	43.18	1.46	37.62	1.27	28	453	26.7	436
									fl.oz. min.		fl. oz.
40	1 180	40	1 169	49.35	1.67	43.00	1.45	32	1 38	30.5	1.03
45	1 257	45	1 250	55.52	1.87	48.37	1.63	36	1 100	34.3	1.16
50	1 334	50	1 332	61.69	2.08	53.75	1.82	40	1 169	38.1	1.29
55	1 411	55	1 413	67.86	2.29	59.12	1.99	44	1½	42.9	1.45
60	2 50	60	2 14	74.03	2.50	64.50	2.18	48	1⅜	45.8	1.55
65	2 127	65	2 95	80.19	2.71	69.87	2.36	52	1¾	50.0	1.68
70	2 205	70	2 176	86.36	2.92	75.25	2.54	56	1⅞	53.4	1.81
75	2 282	75	2½	92.53	3.13	80.62	2.73	60	2	57.2	1.93
80	2 359	80	2⅝	98.70	3.33	86.00	2.91	64	2⅛	61.0	2.06
85	2 436½	85	2⅚	104.87	3.54	91.37	3.09	68	2 3/10	64.8	2.19
90	3 77	90	3	111.04	3.75	96.75	3.27	72	2⅜	68.7	2.32
95	3 153	95	3⅙	117.21	3.96	102.13	3.45	76	2⅝	72.5	2.45
100	3 230	100	3⅜	123.38	4.17	107.50	3.63	80	2 7/10	76.3	2.58
110	3 384	110	3⅝	135.72	4.60	118.25	4.00	88	3	83.9	2.83
120	4 101	120	4	148.06	5.00	129.00	4.36	96	3¼	91.6	3.09
130	4 255	130	4⅓	160.39	5.42	139.75	4.72	104	3½	100	3.38
140	4 410	140	4⅔	172.72	5.84	150.50	5.08	112	3¾	108	3.64
150	5 127	150	5	185.07	6.26	161.25	5.45	120	4 1/10	114	3.86
160	5 282	160	5⅓	197.40	6.66	172.00	5.81	128	4⅛	122	4.12
170	6	170	5⅔	209.74	7.08	182.75	6.18	136	4⅗	130	4.38
180	6 154	180	6	222.08	7.50	193.50	6.54	144	4⅔	138	4.64
190	6 307	190	6⅓	234.42	7.92	204.26	6.90	152	5 1/6	146	4.90
200	7 24	200	6¾	246.76	8.34	215.00	7.27	160	5⅖	153	5.16
250	8 358	250	8½	308.44	10.43	268.75	9.08	200	6¾	191	6.45
300	10 255	300	10⅛	370.13	12.52	322.50	10.90	240	8 1/10	229	7.74
350	12 151	350	11⅚	431.82	14.60	376.25	12.72	280	9 2/10	267	9.03
400	14 48	400	13½	493.51	16.69	430.00	14.54	320	10⅘	305	10.32
450	15 382	450	15¼	555.20	18.77	483.75	16.30	360	12 3/10	343	11.61
500	17 279	500	17	616.89	20.86	537.50	18.17	400	13½	381	12.90
550	19 175	550	18⅔	678.58	22.95	591.20	19.98	440	14⅚	429	14.51
600	21 72	600	20⅓	740.27	25.03	645.00	21.80	480	16⅕	458	15.48
650	22 406	650	22	801.96	27.12	698.70	23.62	520	17½	496	16.77
700	24 303	700	23¾	863.65	29.20	752.50	25.44	560	18 9/10	534	18.06
750	26 199	750	25⅓	925.34	31.29	806.20	27.26	600	20¼	572	19.35
800	28 96	800	27	987.00	33.38	860.00	29.07	640	21⅗	610	20.64
850	29 430	850	28¾	1,048.69	35.46	913.70	30.90	680	23	648	21.93
900	31 327	900	30½	1,110.41	37.55	967.50	32.71	720	24 3/10	687	23.22
950	33 223	950	32¼	1,172.09	39.63	1,021.30	34.52	760	25⅗	725	24.51
1,000	35 120	1,000	34	1,233.78	41.72	1,075.00	36.34	800	27	763	25.80

Baumé's Hydrometer Scales.

For Liquids Lighter than Water. Temperature 60° F.

Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.
10	1.0000	20	0.9333	30	0.8750	40	0.8235	50	0.7777	60	0.7368	70	0.7000
11	0.9929	21	0.9271	31	0.8695	41	0.8187	51	0.7734	61	0.7329	71	0.6965
12	0.9859	22	0.9210	32	0.8641	42	0.8139	52	0.7692	62	0.7290	72	0.6930
13	0.9790	23	0.9150	33	0.8588	43	0.8092	53	0.7650	63	0.7253	73	0.6896
14	0.9722	24	0.9090	34	0.8536	44	0.8045	54	0.7608	64	0.7216	74	0.6863
15	0.9655	25	0.9032	35	0.8484	45	0.8000	55	0.7567	65	0.7179	75	0.6829
16	0.9589	26	0.8974	36	0.8433	46	0.7954	56	0.7526	66	0.7142	76	0.6796
17	0.9523	27	0.8917	37	0.8383	47	0.7909	57	0.7486	67	0.7106	77	0.6763
18	0.9459	28	0.8860	38	0.8333	48	0.7865	58	0.7446	68	0.7070	78	0.6730
19	0.9395	29	0.8805	39	0.8284	49	0.7821	59	0.7407	69	0.7035		

For Liquids Heavier than Water. Temperature 60° F.

Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.	Beaumé.	Specific gravity.
1	1.0069	11	1.0820	21	1.1693	31	1.2719	41	1.3942	51	1.5425	61	1.7261
2	1.0139	12	1.0902	22	1.1788	32	1.2831	42	1.4077	52	1.5591	62	1.7469
3	1.0211	13	1.0984	23	1.1885	33	1.2946	43	1.4215	53	1.5760	63	1.7682
4	1.0283	14	1.1068	24	1.1983	34	1.3063	44	1.4356	54	1.5934	64	1.7901
5	1.0357	15	1.1153	25	1.2083	35	1.3181	45	1.4500	55	1.6111	65	1.8125
6	1.0431	16	1.1240	26	1.2184	36	1.3302	46	1.4646	56	1.6292	66	1.8354
7	1.0507	17	1.1328	27	1.2288	37	1.3425	47	1.4795	57	1.6477	67	1.8589
8	1.0583	18	1.1417	28	1.2393	38	1.3551	48	1.4949	58	1.6666	68	1.8831
9	1.0661	19	1.1507	29	1.2500	39	1.3679	49	1.5104	59	1.6860	69	1.9079
10	1.0740	20	1.1600	30	1.2608	40	1.3809	50	1.5263	60	1.7058	70	1.9333

Alcoholometric Table. At 15.6° C. (60° F.).

Degrees proof U. S. Int. Revenue.	Per cent. alcohol by measure. ("Tralle's scale.")	Per cent. alcohol by weight.	Specific gravity.	Degrees proof U. S. Int. Revenue.	Per cent. alcohol by measure. ("Tralle's scale.")	Per cent. alcohol by weight.	Specific gravity.
Above proof.				Proof.			
100°	100	100	.794	0	50	42.5	.935
90°	95	92.4	.816	Below proof.			
88°	94	91.0	.820	10°	45	37.8	.944
80°	90	85.7	.834	20°	40	33.3	.952
70°	85	79.4	.850	30°	35	29.0	.959
60°	80	73.5	.863	40°	30	24.7	.965
54°	75	67.9	.860	50°	25	20.4	.971
40°	70	62.5	.890	60°	20	16.3	.976
30°	65	57.2	.902	70°	15	12.1	.981
20°	60	52.2	.913	80°	10	8.0	.986
10°	55	47.2	.924	90°	5	4.0	.993
6°	53	45.3	.928	100°	0	0	1.000